THE LANCET

A Journal of British and Foreign Medicine, Surgery, Obstetrics, Physiology, Chemistry, Pharmacology, Public Health, and News.

Telegrams—LANCET, WESTRAND LONDON. *Telephone*—GERRARD 4314 & 4315. *Offices*—423, Strand, London, W.C.

No. XII. OF VOL. I., 1929. **No. 5508. Vol. CCXVI.** LONDON, SATURDAY, MARCH 23, 1929 Founded 1823. Registered as a Newspaper. Published Weekly. **Pp. 120—Price 1s.** Annual Subscription Inland £2 2s. Abroad £2 10s.

OXFORD MEDICAL PUBLICATIONS.

SEE PAGE 2.

Size 10 in. × 7½ in. Pp. xvi + 376. With 4 Coloured Plates and 220 Illustrations. Price 30s. Postage: Inland, 9d.; Abroad, 1s.

PROTOZOOLOGY:
A MANUAL FOR MEDICAL MEN.
By JOHN GORDON THOMSON, M.A., M.B., Ch.B., Director, Dept. of Protozoology, London School of Tropical Medicine; and ANDREW ROBERTSON, M.B., Ch.B., Lecturer, Department of Protozoology, London School of Tropical Medicine.
Baillière, Tindall & Cox, 7 & 8, Henrietta-street, London, W.C.2.

NOW READY. Fourth Edition. Pp. x + 414. Price 5s.

AIDS TO MEDICINE.
By JAMES L. LIVINGSTONE, M.D. Lond., Junior Physician, King's College Hospital.
Baillière, Tindall & Cox, 7 & 8, Henrietta-street, London, W.C.2.

JUST PUBLISHED. New Volume in the Students' Aids Series. Pp. viii + 166. Price 3s. 6d.

AIDS TO PSYCHOLOGY
By JOHN H. EWEN, M.R.C.S.Eng., L.R.C.P.Lond., Assistant M.O., Surrey County Mental Hospital, Netherne.
Baillière, Tindall & Cox, 7 & 8, Henrietta-street, London, W.C.2.

ABDOMINAL SURGERY OF CHILDREN.
By L. E. BARRINGTON-WARD, Ch.M., F.R.C.S.(Edin.), F.R.C.S.(Eng.).
Pp. 300. 82 Illustrations. 3 Colour Plates. 15s. net.
"Should make a wide appeal alike to surgeon, general practitioner, and student."—BRITISH MEDICAL JOURNAL.
Oxford University Press, Amen House, Warwick-sq., London, E.C.4.

FIFTH EDITION. Pp. v. + 251. With Coloured Plate and 98 other Illustrations. Price 8s. 6d. Postage 6d.

REFRACTION OF THE EYE.
By ERNEST CLARKE, C.V.O., M.D., F.R.C.S.
The simplest book on Refraction, especially written for the General Practitioner.
"Can be recommended to the student as the very best on its subject."—BRITISH MEDICAL JOURNAL.
Baillière, Tindall & Cox, 7 & 8, Henrietta-st., Covent Garden, W.C.2.

Fourth Edition. With 26 Illustrations. Demy 8vo. 6s. net, postage 6d.

PHYSIOLOGY OF THE CENTRAL NERVOUS SYSTEM AND SPECIAL SENSES
(FOR THE USE OF STUDENTS).
By N. J. VAZIFDAR, L.M. & S., F.C.S., F.C.P.S., Examiner in Medical Jurisprudence and Mental Diseases in the University of Bombay, etc.
"The Author has succeeded in preparing a concentrated and detailed account of his subject without being exhaustive or obscure."—BRAIN.
Obtainable from
H. K. Lewis & Co. Ltd., 136, Gower-street, W.C.1.

H. K. LEWIS & CO. LTD.,
MEDICAL PUBLISHERS AND BOOKSELLERS.
MEDICAL AND SCIENTIFIC CIRCULATING LIBRARY.
EASTER HOLIDAYS, 1929.
All Departments will be closed MARCH 29, 30, 31, and APRIL 1.
London: 136 & 140, Gower-street, 24 & 28, Gower-place, W.C.1.

RECENTLY ISSUED.

MOYNIHAN'S
ADDRESSES ON SURGICAL SUBJECTS.

See Saunders' Advertisement on Page 3.

JUST PUBLISHED. Demy 8vo. 96 pp. 6s. net. Postage 5d.

NOTES ON CHRONIC OTORRHŒA WITH ESPECIAL REFERENCE TO THE USE OF ZINC IONIZATION IN THE TREATMENT OF SELECTED CASES
By A. R. FRIEL, M.A., M.D. (Dub. Univ.), F.R.C.S.I.
Bristol: John Wright & Sons Ltd. London: Simpkin Ltd.

NEPHRITIS: ITS PROBLEMS AND TREATMENT.
By T. IZOD BENNETT, M.D. (London), F.R.C.P., Physician with Charge of Out-Patients, Middlesex Hospital; Physician to the Royal National Orthopædic Hospital, &c.
104 pages. Illustrated. 6s. net.
Oxford University Press, Amen House, London, E.C.4.

CLINICAL OBSERVATIONS ON
INFANT FEEDING AND NUTRITION.
By H. B. GLADSTONE, M.D. (Edin.)
Demy 8vo. Illustrated. 7s. 6d. net.
"A book written by a general practitioner for general practitioners, welfare workers, nurses and mothers; it should prove to be invaluable to the just qualified to whom such matters are usually a mystery yet to whom, with general practice, they are of much importance."—CHARING CROSS HOSP. GAZ.
Wm. Heinemann (Medical Books) Ltd., 99, Great Russell-street, London, W.C.1.

THIRD EDITION. With many Illustrations. 12s. 6d. net.

TREATMENT OF DISEASES OF THE SKIN.
By KNOWSLEY SIBLEY, M.A., M.D., B.Ch. (Cantab.).
London: Edward Arnold & Co., 41 and 43, Maddox-street, W. 1.

METHODS AND USES OF
HYPNOSIS AND SELF-HYPNOSIS.
By BERNARD HOLLANDER, M.D. 6s.
Dr. Hollander's new book is the result of thirty years' experience of experimental hypnosis and hypnotic treatment, and contains directions how to apply hypnotism for the treatment of functional nervous and mental disorders and moral failings, as well as detailed evidence of phenomena throwing light on the mysteries of thought-transference, clairvoyance, etc.
Geo. Allen & Unwin, Museum St., London, W.C.1.

J. & A. CHURCHILL'S NEW BOOKS

BERTWISTLE SURGICAL RADIOLOGY 24 Illus. 8s. 6d. Postage 6d.

BRAIN & STRAUSS RECENT ADVANCES IN NEUROLOGY 38 Illus. 12s. 6d. Post. 6d.

LIDDIARD THE MOTHERCRAFT MANUAL 7th Ed. 36 Illus. 3s. 6d. Post. 3d.

CONNOR SURGERY IN THE TROPICS 99 Illus. 12s. 6d. Postage 6d.

DEVINE RECENT ADVANCES IN PSYCHIATRY Illustrated. 12s. 6d. Postage 6d.

CADE RADIUM TREATMENT OF CANCER 62 Illus. 15s. Postage 9d.

GOLDZIEHER THE ADRENALS, PHYSIOLOGY, PATHOLOGY, DISEASES 73 Illus. 30s. Postage 9d.

FOWWEATHER CLINICAL CHEMICAL PATHOLOGY 18 Illus. 8s. 6d. Post. 6d.

London: J & A. CHURCHILL, 40, Gloucester Place, Portman Square, W. 1.

Felsol

ASTHMA

Felsol

INTERNAL NON-NARCOTIC TREATMENT

According to statistics the use of Felsol on patients suffering from Bronchial and Cardiac Asthma resulted in 80% of the cases having instant relief, and the return of asthmatic attacks was prevented in many of these by administering one or two powders a day.

Felsol is entirely free from narcotics. Cumulative doses are not necessary, neither does it produce injurious after-effects.

Clinical Sample and Literature post free upon request.

BRITISH FELSOL CO., LTD., 15 CAROLINE STREET, W.C.1.

Telephone: Museum 2855. Telegrams: "Felsol, Holb., London."

ZŌPLA HAS A CHARACTERISTIC GRIP WHICH PREVENTS SLIPPING

It causes no irritation.

Does not deteriorate in stock and is supplied on strong cloths suitable for surgeons. Various sizes.

Samples sent on request.

LESLIES LTD., High St., WALTHAMSTOW, LONDON, E.17

Well known as manufacturers of Holland Strapping.

BRITISH SCIENCE TRIUMPHS OVER DEAFNESS

ORAVOX

BRITISH THROUGHOUT

The complete range of Oravox Deaf-aids, suitable for all forms of deafness, can be demonstrated to you or submitted for you to test to your complete satisfaction. The Oravox works, offices, and consulting rooms are open for your inspection at any time. Oravox Deaf-aids are entirely British throughout and your attention is drawn to the undermentioned names associated with this undertaking to produce really practical and efficient aids to deafness.

Technical Advisers for Oravox Ltd.:

SIR OLIVER LODGE, F.R.S., D.Sc., LL.D., etc.

Prof. A. F. C. POLLARD, F.Inst.P., etc. Mr. C. M. R. BALBI, A.I.M.E.E., etc.

ORAVOX LIMITED

26 LANGHAM STREET, LONDON, W.1

Telephone: MAYFAIR 6178.

THE LANCET

No. 5508. LONDON, SATURDAY, MARCH 23, 1929. CCXVI.

CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT.

LUMLEIAN LECTURES entitled a Medical Review of the Surgery of the Chest. By R. A. YOUNG, F.R.C.P.—Lecture I. 593

ORIGINAL ARTICLES.

Localisation of Intracranial Tumours. By HUGH CAIRNS, F.R.C.S.—(*Illustrated*) 600

The Cholesterol Metabolism during Pregnancy. By J. ADDYMAN GARDNER, M.A., and HUGH GAINSBOROUGH, M.R.C.P.—(*Illustrated*) 603

CLINICAL AND LABORATORY NOTES.

Puerperal Infection Due to B. aerogenes capsulatus. By FRANCES IVENS, M.S. 606

Auricular Flutter after Diphtheria in a Child. By PATRICK O'DONOVAN, M.R.C.P.—(*Illustrated*) .. 607

MEDICAL SOCIETIES.

Royal Society of Medicine: Section of Obstetrics: Future of the Maternity Services 609

Liverpool Medical Institution: Effects of Lead on the Tissues 611

Harveian Society: The Derating Bill 612

REVIEWS AND NOTICES OF BOOKS.

The Chemistry of Chemotherapy. By G. Malcolm Dyson, Ph.D. 613

Common Colds. By Leonard Hill, M.B., F.R.S., and Mark Clement 613

Hospitals and the State. By R. Westland Chalmers, M.B. 614

Medical Adventure. By Ernest Ward, M.D. 614

Ergebnisse der Gesamten Medizin. Edited by Prof. Brugsch 614

Diseases of Infants and Children. By Prof. H. D. Chapin, M.D., and Prof. L. T. Royster, M.D. 614

LEADING ARTICLES.

SUN-WORSHIP 615

MEDICAL POLICY IN INDIA 616

THE NATURE OF FILTRABLE VIRUSES 617

ANNOTATIONS.

The King 618

A Laboratory Service for Insured Persons 618

The Prevalence of Appendicitis 618

The Metabolism of Cholesterol 619

Tularæmia in Domestic Animals 619

A Meaning for Synergism .. 620

Vocational Guidance 620

The Rationale of Therapeutic Pneumothorax .. 621

Ophthalmology in Relation to Research 621

The Supply of Dentists .. 621

Local Government Bill.... 622

A Valuable Year Book 622

CLINICAL INTERPRETATION OF AIDS TO DIAGNOSIS.

XXVI.—Albuminuria. By J. C. SPENCE, M.R.C.P. 623

SPECIAL ARTICLES.

Clemens Pirquet and his Work (Miss HARRIETTE CHICK, D.Sc.)—(*Illustrated*) 624

Berlin: Anti-Accident Week 626

United States of America: Deaths of Physicians .. 627

Ireland: Sanatoriums and Tuberculosis 628

Medical Research Council Report: Comments on Innovations in Treatment 628

Cancer and Tuberculosis: The Supposed Antagonism 632

CORRESPONDENCE.

Cerebral Surgery (Sir E. Farquhar Buzzard) 633

Operating for Appendicitis (Mr. Hamilton Bailey) . 633

Gamma Radiation (Sir Charles Gordon-Watson and Mr. Stanford Cade) . 634

Glass-workers' Cataract (Mr. Wm. Robinson).... 634

The Injection Treatment of Varicose Veins (Prof. Archibald Young) 634

The Prevention of Influenza (Mrs. E. A. Rainsford) .. 635

Chronic Carbon Monoxide Poisoning (Dr. Gerald Slot) 635

Noise and Annoyance (Dr. T. G. Nasmyth)..... 635

PUBLIC HEALTH SERVICES.

Influenza 636

Infectious Disease in England and Wales 636

OBITUARY.

Walter Jagger, M.B., C.M. 636

William Wrangham, M.R.C.P. 636

Arnold William Montfort Auden, M.B. 637

PARLIAMENTARY INTELLIGENCE.

Notes on Current Topics: Local Government Bill.. 637

Local Government (Scotland) Bill 638

House of Commons: Sick Leave among Women Clerks.—Chlorodyne as a Drug of Addiction.—Medical Men and Lunacy Certification.—Tenure of Office of Public Health Officers.—The London Lock Hospital.—Insurance Companies and Health Benefits.—Protection against Anthrax.—Medical Examination of Emigrants 638

THE SERVICES.

Royal Naval Reserve of Officers.—Royal Army Medical Corps.—Royal Air Force.—Indian Medical Serivce 641

MEDICAL NEWS.

Royal College of Surgeons of England 640

University of London..... 640

A Congress at Zürich 622

Deaths in London Streets.. 632

Fellowship of Medicine and Post-Graduate Medical Association..... 632

Liverpool Foot Hospital .. 635

Queen Charlotte's Maternity Hospital 635

Encephalitis Lethargica in Manchester..... 637

Donations and Bequests... 637

Birmingham Contributory Scheme 639

St. Andrew's Hospital 639

Royal Dental Hospital of London 640

Radiological Diagnosis of Respiratory Disease 64

Royal London Ophthalmic Hospital 640

Scholarships and Grants in Aid of Research..... 640

Royal Navy Medical Club 640

Lion Hospital Aid Society 640

Seamen's Hospital Society 640

St. Mark's Hospital 640

NOTES, COMMENTS, AND ABSTRACTS.

Maintenance of Life in Isolated Muscle 642

National Baby Week Council 643

The Position of Sussex Hospitals 644

The Work of No. 3 Canadian General Hospital 644

Medical Diary 641

Appointments 641

Vacancies 641

Births, Marriages, Deaths.. 642

THE LONDON AND COUNTIES MEDICAL PROTECTION SOCIETY LIMITED.

(FOUNDED 1892)

Registered Office: VICTORY HOUSE, LEICESTER SQUARE, W.C.2.

Telegrams: "MEDICAVERO, WESTRAND, LONDON." *Telephone:* REGENT 0611.

President: Sir JOHN ROSE BRADFORD, K.C.M.G., C.B., C.B.E., M.D., P.R.C.P., F.R.S.
Treasurer and Chairman of Council: C. M. FEGEN, M.R.C.S., L.R.C.P., D.P.H.
Trustees for the Reserve Fund:
Rt. Hon. LORD DAWSON, G.C.V.O., K.C.B., M.D., F.R.C.P. Sir ANTHONY A. BOWLBY, Bart., K.C.B., K.C.M.G., K.C.V.O., F.R.C.S. Sir HARRY BALDWIN, C.V.O., M.R.C.S., L.D.S.

The Society was founded for the following purposes: To protect, support, and safeguard the character and interests of legally qualified Medical and Dental Practitioners; to advise and assist Members of the Society in matters affecting their professional character and interests; and to indemnify them in regard to actions, etc., undertaken on their behalf.

SUBSCRIPTIONS. There is an Entrance Fee of 10s., and an Annual Subscription of £1.

The Invested Funds of the Society exceed £38,100. The Society is fully insured to an unlimited extent against all adverse costs and damages which may be awarded against Members in any action which the Society undertakes on their behalf.

Forms of application for Membership and full particulars may be obtained from the Secretaries at the above address.

OXFORD MEDICAL PUBLICATIONS

A SELECTION OF CURRENT TITLES.

NEPHRITIS: ITS PROBLEMS AND TREATMENT. NET.

By **T. IZOD BENNETT,** M.D. (Lond.), F.R.C.P. Pp. 104. Illustrated. 6/-

RADIOTHERAPY IN RELATION TO GENERAL MEDICINE.

By **F. HERNAMAN-JOHNSON,** M.D. (Aberd). Pp. 212. .. .. 5/-

ŒSOPHAGEAL OBSTRUCTION. Its Pathology, Diagnosis, and Treatment.

By **A. LAWRENCE ABEL,** M.S. (Lond.), F.R.C.S. (Eng.) Pp. 245. 132 Illus. 2 Coloured Plates. 30/-

THE CYTOARCHITECTONICS OF THE HUMAN CEREBRAL CORTEX.

By **CONSTANTIN VON ECONOMO.** English Translation. Pp. 198. 61 Illus 21/-

THE TREATMENT OF THE SICK POOR OF THIS COUNTRY.

By **H. J. McCURRICH,** M.S., M.B. (Lond.), F.R.C.S. (Eng.). Pp. 140. .. .. 5/-

THE PRINCIPLES OF CLINICAL PATHOLOGY IN PRACTICE.

A Guide to the Interpretation of Laboratory Investigations for the use of those engaged in the Practice of Medicine.

By **GEOFFREY BOURNE,** M.D., M.R.C.P., and **KENNETH STONE,** M.D., M.R.C.P. Pp. 402. 10 Illus. 16/-

TWEEDY'S PRACTICAL OBSTETRICS.

Edited and largely rewritten by **BETHEL SOLOMONS,** M.D., F.R.C.P.I., M.R.I.A (6th Ed.). Pp. 781. 294 Illus. 25/-

DIAGNOSIS AND TREATMENT OF DEFORMITIES IN INFANCY AND EARLY CHILDHOOD.

By **M. F. FORRESTER-BROWN,** M.S., M.D. Pp. 210. 79 Illus. 14/-

THE PNEUMOTHORAX and Surgical Treatment of Pulmonary Tuberculosis. NET.

By the late **CLIVE RIVIERE,** M.D., F.R.C.P. 2nd Ed. Pp. 334. 25 Illus. 10/6

DISEASES OF THE HEART.

By **FREDERICK W. PRICE,** M.D., F.R.S. (Edin.). 2nd Ed. Pp. 250. 249 Illus. 211 Charts. 21/-

THE PRINCIPLES OF ELECTRO-THERAPY and their PRACTICAL APPLICATION.

By **W. J. TURRELL,** M.A., D.M., B.Ch. (Oxon.), D.M.R. & E. (Cantab.). New (2nd) Edition. Pp. 429. 34 Illustrations. 16/-

APPLIED PHYSIOLOGY.

By **SAMSON WRIGHT,** M.D., M.R.C.P. 2nd Ed. Pp. 536. 109 Illus. 18/-

HÆMORRHOIDS: Their Ætiology, Prophylaxis and Treatment by means of Injection.

By **ARTHUR S. MORLEY,** F.R.C.S. (Eng.). New (4th) Impression, revised and enlarged. Pp. 136. 10 Illus. 1 Coloured Plate 6/-

LIPIODOL IN THE DIAGNOSIS OF THORACIC DISEASE.

By **F. G. CHANDLER,** M.A., M.D., F.R.C.P., and **W. BURTON WOOD,** M.A., M.D., M.R.C.P. Pp. 141. 47 Skiagrams 10/6

HANDBOOK OF MICROSCOPICAL TECHNIQUE.

For Workers in both Animal and Plant Tissues.

Edited by **C. E. McCLUNG,** Ph.D. Pp. 509. 43 Illus. .. 36/-

WILLIAM HARVEY.

By **ARCHIBALD MALLOCH** M.D. (McGill), M.R.C.P. (Lond.). Pp. 113. 10 Plates. 3 Figs. 7/6

COMPLETE CATALOGUE SENT UPON REQUEST.

Oxford University Press

HUMPHREY MILFORD. Department "R," Falcon Square, London, E.C. 1

Telephone: CITY 8960. *Telegrams:* OXUNIPRES, CENT, LONDON.

Lumleian Lectures

ENTITLED

A MEDICAL REVIEW OF THE SURGERY OF THE CHEST.

Delivered before the Royal College of Physicians of London

BY R. A. YOUNG, C.B.E., M.D., B.SC. LOND.,

FELLOW OF THE COLLEGE; SENIOR PHYSICIAN TO THE MIDDLESEX HOSPITAL; PHYSICIAN TO THE BROMPTON HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST.

LECTURE I.

Delivered on March 19th, 1929.

MR. PRESIDENT, CENSORS, AND FELLOWS OF THE COLLEGE,—Curiosity, stimulated by the search for a subject, and by a brief reference in the College List to Holinshed's "Chronicles,"[1] impelled me to delve a little into the early history of the Lumleian lectures. I found that they were the joint foundation of Dr. Richard Caldwell and the Lord Lumley, and were endowed by each equally. Though initiated in 1581, the first series were not given until 1582, when Dr. Richard Forster[2] was appointed lecturer, a post he filled until 1602. The immortal Harvey was appointed lecturer in 1615 and held the post for 41 years. It was through the medium of these lectures that he first published his views on the circulation.

There can be little doubt that the relations between Lord Lumley and Dr. Caldwell were those of professional attendance and friendship, and that the zeal of the latter for the advancement of his profession, backed by his own generosity, stimulated Lord Lumley to a like enthusiasm and practical sympathy. Lord Lumley was a learned man and a member of the Elizabethan Society of Antiquaries. His library was bought by King James I. and eventually given to the British Museum by King George III. He seems to have sympathised with Mary, Queen of Scots, and he languished in the Tower in 1569 and in the Marshalsea in 1571.[3] Though he died on Tower Hill, he was fortunate enough to do so in his own house and with his head on his shoulders, instead of in the adjacent execution ground. His father was both attainted and executed, and the peerage was a restoration to the status of his grandfather.

Dr. Caldwell is referred to in Holinshed as the "English Hippocrates and Galen." He was admitted a Fellow of this College in 1559 and made a censor the same day. He was afterwards President in 1570. It would seem that Caldwell was specially interested in surgery. His one published book, a posthumous publication, was a translation of some "Tables of Surgerie" by Horatius Morus, a Florentine physician. His tomb "at St. Benet's by Paule's Wharf" was adorned with surgical instruments and other appropriate devices. A further evidence of this interest is the explicit direction that these lectures were to be on surgery "for the common benefit of London and consequentlie of all England." It is stated that "before the foundation of these lectures there have been lectures on physic, though chiefly at the universities, that the needfulness of similar instruction in surgery is apparent, as hitherto hath been the want and lack so hurtful." It is also claimed that "the like thereof is not established nor used in any Universitie of Christendom (Bononie and Padua excepted), and therefore it is the more to be esteemed." It is recommended that they are to deal "onlie of surgerie and not of physicke." It further says "that part which onlie useth the hand, as it is sorted from the apothecarie." Caldwell also hoped that these lectures would be to the "common profit of Her Majestie's subjects and good fame, with increase and credit of all the surgians of this Realme." He was evidently both progressive and practical, for he directs that the lecturer shall "read for ¾ hour in Latine, and the other quarter in English, wherein shall be plainlie declared for those that understand not Latine, what was said in Latine." He was also "to dissect openly all the bodie of a man, especiallie the inward parts, for five days together, as well before as after dinner, if the body may so last without annoie."

The College evidently esteemed the gift highly, as it set aside £100, the major part of its reserve, to enlarge the College buildings, then consisting of the house devised to them by will of Dr. Linacre. It comes as a disappointment to learn that there is a note on July 17th, 1584, in the College records of the want of attendance at these chirurgical lectures.

This short incursion into historical matters is my apologia for my choice of subject. I feel that in presenting a Medical Review of the Surgery of the Chest, though I am departing from long-established precedent, I may yet conform in some small degree to the wishes of the pious and enlightened founders.

THE SURGERY OF THE CHEST.

Boundary or border areas are usually the scene of strife and conflict where countries or policies are concerned, and the subject of argument or polemics where ideas, ideals, or methods impinge on one another. The boundary zone of surgery and medicine is no exception. There is something fundamentally different in medicine and surgery. Medicine is in the main abstract, dealing with deranged organs and with disturbed functions. Surgery is in its essence concrete and mechanical, and is concerned in removal, adjustment, and adaptation.

There would be few to dispute that some of the greatest triumphs of surgery are in the failures of medicine, but, on the other hand, some of the greatest surgical tragedies occur where surgery has been ill-advisedly or unsuccessfully invoked in medical conditions. This is most emphatically true in regard to the surgery of the chest. If this branch of surgery is to advance, and I believe it to have a great and beneficent future before it, it must advance along right lines. There must be the closest, the most understanding and sympathetic coöperation between the physician and the surgeon. There must be a close conformity to the conditions existing between the neurologist and the specialist nerve surgeon, rather than to the conditions which unfortunately occur too often in regard to the surgery of the stomach and duodenum, in which some too enthusiastic surgeons have come to regard surgery as a primary means of treatment, which it is not.

Surgery can afford the most dramatic assistance to the physician in cases of disease of the lungs, bronchi, mediastinum, and pleura in cases otherwise grave or even hopeless. What is needed is a better understanding on the part of the physician and of the general practitioner of what surgery can do and perhaps even more of what it cannot yet achieve. Ill-informed opposition and too enthusiastic recommendation are alike to be avoided. In no branch of our science is efficient and adequately coördinated "team-work" more essential, but the physician should in the end be the predominant partner, or at any rate have the casting vote. The surgeon should be his co-adjutor and his agent, but certainly not his substitute. It is true that many surgeons who have specialised in thoracic surgery have been accomplished and skilled students of physical signs and of diagnosis. The late Sir Rickman Godlee was a first-rate observer, even with the stethoscope, as well as an accomplished surgeon, while I can testify that the present-day thoracic surgeon has often a knowledge of the medical aspects of thoracic disease which many physicians might envy. It is equally true to say a physician concerned with chest diseases should have a knowledge of surgical principles and technique at least sufficient to enable him to appraise the chances of success of the procedures he recommends.

This naturally raises the question whether in the future, if specialisation advances to its logical development, the diagnosis and treatment may not eventually be concentrated in one person. There is some precedent

for this, since Saugman, who helped on the progress of surgery as applied to pulmonary tuberculosis, did his own thoracoplasties. Brauer now carries out his own operations, and Gravesen, Saugman's successor at Vejlefjord Sanatorium, is both physician and surgeon to the patients under his care. I have an open mind on this subject, but I feel that at present the ideal arrangement is an understanding and critical coöperation between physician and expert surgeon. I like to discuss my cases with my surgical colleagues, and welcome criticism and alternative suggestions.

The team in regard to successful surgery in chest diseases involves more than the physician and the surgeon. The radiologist plays an increasingly important rôle, the bacteriologist, hæmatologist, physiologist, or biochemist may contribute crucial information, or even veto the appeal to surgery. Lastly, the anæsthetist is contributing greatly to the success of chest operations. The advances in his art have rendered the major operations possible and have eliminated many dangers. In this connexion it is not too much to say that the organisation of the surgeon's operative team is a most important factor in successful operation. The anæsthetist, the assistant, the sister and the nurses combine to form a coördinated mechanism which compels admiration, and which economises time and effort.

As I shall show later, time and the avoidance of shock are factors of vital importance to the patient. An operation like thoracoplasty demands great energy, concentration, and judgment, especially in regard to the extent of rib removal. In expert hands it is an admirable operation, in the hands of the tyro it is apt to be a shambles. It is for these reasons that it is to be hoped that, at any rate for the present, the more difficult and special operations will only be attempted by surgeons experienced in this work.

The early history of thoracic surgery in this country is in some senses a record of misfortune and of tragedy. The fundamental ideas and some of the earliest achievements stand to the credit of British observers. The essential and fundamental idea of collapse of the lung as the basis of treatment of many pulmonary conditions dates from Dr. Carson's [4] brilliant suggestions in 1820. He foresaw the benefit likely to result from collapse of the diseased lung induced by pneumothorax. In both cases in which he had attempts made to carry this out by open incision adhesions were present at the site and no pneumothorax was obtained.

Cayley,[5] in 1885, had an open pneumothorax induced by Pearce Gould to try to arrest severe hæmoptysis. Although the operation appears to have been effective in stopping the hæmorrhage, the patient died shortly afterwards from extension of the disease.

Cavities were drained as long ago as 1844 in this country by Dr. John Hastings and Mr. Storks.[6] Dr. Shingleton Smith injected medicaments into pulmonary cavities in 1885. Lowson [7] removed diseased portions of tuberculous lung in 1893, and Sir William Macewen [8] in 1895 removed the left lung for advanced tuberculous disease, probably with pyopneumothorax, the patient being alive 18 years afterwards. It was a misfortune that these successes were, as it were, accidental, and rather diverted attention from the more rational methods advocated by Carson, and now so fully established. Sir Rickman Godlee did most valuable work at the Brompton Hospital, and the thoracic surgery he carried out was sound and practical. The pioneer of the modern applications of chest surgery in this country is Mr. Morriston Davies,[9] who began to carry out special chest operations as early as February, 1913. His writings and his operative work are notable and stimulating contributions to the subject. His departure from London to a more restricted field of activity was a great misfortune, though he continues to do excellent special chest surgery in Wales.

The preoccupations of the years of the Great War doubtless further hindered the progress of chest surgery in this country, although owing to the coöperation of physicians, surgeons, and bacteriologists in the investigation of wounds of the chest, the treatment of these and of the conditions consequent upon them, such as hæmothorax and empyema, was stabilised and greatly improved. A further advance was the general recognition of the safety under ordinary precautions of thoracotomy. In these important developments, Sir John Rose Bradford, Prof. T. R. Elliott,[10] Dr. William Pasteur, Sir Wilmot Herringham, Dr. A. B. Soltau on the medical side, with Sir Berkeley Moynihan, Sir Henry M. W. Gray, and Prof. G. E. Gask on the surgical side, all played a notable part.

At the present time the rôle of surgery in chest disease is becoming more widely recognised and the special chest hospitals in London have developed arrangements to deal with the demand. At the Brompton Hospital a special surgical department, admirably equipped, is now in full working order in the charge of Mr. J. E. H. Roberts and Mr. A. Tudor Edwards. The results already obtained are more than encouraging. My colleagues and I find the assistance of our surgical colleagues increasingly necessary, as the indications for surgery become more clearly defined and the results more convincing. Similar work is being done at Victoria Park Chest Hospital by Mr. W. H. C. Romanis and Mr. R. H. O. B. Robinson.

The reasons why the surgery of the chest and especially that of the lung and mediastinum has developed later than other special applications of surgery are in the main: (1) The difficulty of access, owing to the bony thoracic cage with its serous lining. (2) The fear of open pneumothorax with the resulting collapse of the lung and sometimes rapid death. (3) The difficulty in collapsing cavities. (4) The risk of mediastinal flutter. (5) The occurrence of cerebral abscess and septic meningitis after empyema, bronchiectasis, and pulmonary abscess, first noted by Sir William Gull [11] in 1857. There is no reason to think that operation promotes these conditions, indeed we may hope that surgery will diminish their incidence. (6) The fear of gas embolism and of pleural shock or reflex. Both of these conditions are now rare with present-day methods.

Modern thoracic surgery dates from the last few years of the nineteenth century. Since that time its progress has been remarkable and the literature of the subject is now enormous. Modern developments in thoracic surgery have been rendered possible by: (1) A more accurate appreciation of the mechanics of respiration, including the intrapleural and intrapulmonary pressures, and of the part played by the mediastinum in thoracic physics. (2) Improved methods of diagnosis. (3) Modern developments in anæsthesia both local, regional, and general. (4) Rigorous selection of cases and careful preparation. (5) Improvements in technique, resulting in saving of time and avoidance or lessening of shock, with careful nursing, dressing, and after-treatment.

These factors may with advantage be considered categorically in some detail.

Respiratory Physics.

After the earliest inspirations of post-fœtal life the lungs are expanded, the alveoli become opened out by air, and the elastic tissue stretched, resulting after about four days in a constant tendency for the lungs to retract from the chest wall, which is expressed in a negative or subatmospheric pressure. The figures for these pressures, given by Donders, are those usually quoted—viz., −6 mm. of Hg at rest or in the cadaver, −7·5 mm. Hg at end of expiration, −9 mm. Hg at end of ordinary inspiration. At the end of deep inspiration it can reach −30 mm. Donders [12] is stated to be the first to have made these measurements in man in 1853, but Carson in 1820 recognised this elastic tension and its significance in regard to respiration and in promoting the circulation. Aron,[13] in 1902, made some actual measurements with a glycerine manometer on a normal,

healthy person, and obtained as a mean of 36 observations at the height of normal quiet inspiration −4·64 mm. Hg. and at the height of quiet expiration −3·02. At rest the intrapulmonary and intrabronchial pressure is naturally that of the atmosphere. It is 2 or 3 mm. Hg below this during quiet inspiration and an equal amount above it during ordinary expiration. In forced inspiration it may reach a negative pressure of −57 mm. Hg, and in forced expiration a positive pressure of 87 mm. Hg or even higher when breathing into and out of a closed space or against a mercury manometer. The pressure attained with forced expiration with closed glottis as in cough is therefore considerable.

It is important to remember in this connexion that the respiratory functions can be effectively carried out when the external pressure is below or above the ordinary atmospheric pressure, and this fact is utilised in some of the modern methods of administering anæsthetics. It must be borne in mind also that so long as the chest wall is intact the intrapleural pressure is always less than the intrapulmonary by just so much as corresponds to the degree of stretching of the lung tissue.

From the standpoint of thoracic medicine and surgery, the alterations induced in the pressure relations by gas and effusion in the pleural cavity, or by growths in the bronchi and mediastinum, are of fundamental importance. The history of our knowledge of pneumothorax up to 1903 has been exhaustively studied by Emerson.[14] Itard,[15] in his Paris thesis of 1803, first applied the convenient name of pneumothorax to the condition of gas in the pleural space, and he has often on this account been regarded as the discoverer of the condition. Emerson's historical survey has, however, established that Boerhaave, Meckel, and others had observed the presence of gas in the pleura. Hewson,[16] in 1767, clearly recognised the condition, and even suggested paracentesis thoracis to let air out of the chest. His teacher, Alexander Monro the younger, of Edinburgh, claimed priority for this idea, made in his lectures in 1761–62, and Hewson later admitted that he may have heard Monro make this suggestion. Hewson also observed that in gunshot wounds of the chest, the difficulty of breathing, which was often extreme when the wound was open, became greatly relieved when it was closed, an observation which the modern thoracic surgeon has often confirmed. It is interesting to note that in the fourteenth century Henri de Mondeville[17] advised the closure of penetrating chest wounds.

From the time of Itard pneumothorax became the subject of very numerous observations on the part of clinicians and pathologists. Laënnec was almost certainly the first to diagnose the condition during life, and with characteristic thoroughness gave an account of the signs, to which little has been added, save that he does not seem to have observed the displacement of the heart, which so commonly occurs. This was apparently first recorded by M. A. Gaide in 1828, though he states that Laënnec had seen it once.

Important contributions to the study of pneumothorax were made by our former President, Sir Richard Douglas Powell[18] in 1868 and 1869. He first pointed out that the heart and mediastinum are maintained in position by the balanced opposing negative pressures of the two pleural spaces, and that in pneumothorax the displacement is due to the unbalanced or unopposed traction by the sound side, and not to pressure: moreover, he was apparently the first to recognise that in valvular pneumothorax a definite positive pressure could occur, causing further displacement of the heart and mediastinum and increasing the embarrassment of respiration and circulation, sometimes to a dangerous or even fatal degree. His observations paved the way for the general adoption of the simplest form of thoracic decompression by insertion of a trocar into an intercostal space, and he recommended this to be done, although J. Davy in 1823[19] and James Johnson in 1829[20] had both demonstrated the valvular nature of the opening in cases of pneumothorax and both withdrawn gas by puncture, giving relief to the patients. This simple procedure often gives rapid and dramatic relief and has no doubt saved many lives. It is now generally performed by reversing a pneumothorax apparatus, so that the amount of gas withdrawn can be measured, and the pressures at the beginning recorded and those at the end of the operation controlled.

The classification of pneumothorax into open, closed, and valvular varieties appears to have been made first by Unverricht[21] in 1879, though Weil arrived at a similar classification in the same year on experimental grounds. This classification is still current and is useful.

In closed pneumothorax, whether the original opening be in the parietal or the visceral pleura, the gas quickly takes on the composition of alveolar air by diffusion, and is rapidly absorbed, unless the pleura becomes infected. It is for this reason that in therapeutic pneumothorax spaced refills become necessary. It is interesting in this connexion to note that as time goes on the pleura becomes less absorbent of the air, so that longer spacing is possible. In valvular pneumothorax the condition of the patient becomes rapidly grave, unless relief is given by paracentesis, as has just been described.

In open pneumothorax, when the opening is in the visceral pleura, the lung is collapsed and the intrapleural pressure on that side varies with the intrapulmonary, being practically atmospheric. The heart and mediastinum are displaced to the sound side unless prevented from moving by adhesions. In open pneumothorax with an external wound the conditions are less constant, and there is even at the present time some controversy both as to the actual facts and as to the explanations of the varying conditions observed. It is generally admitted that with a large unilateral external opening rapid and extensive, even complete, collapse of the lung occurs. Great distress and rapid death may result.

The explanation of the grave effects of widely open pneumothorax was supplied by Murphy in 1898.[22] He pointed out that with a free external opening into one pleura the lung in that pleura collapses during inspiration, but expands on expiration. The mediastinum and its contents are displaced by traction to the sound side during inspiration, with the result that adequate ventilation of that side is impeded. On expiration the mediastinal septum bulges towards the side of the open pleura and air is drawn into the collapsed lung. This to and fro movement of the mediastinal septum and its contents is now known as "mediastinal flutter." It is one of the conditions which has to be prevented in operations upon the thorax involving extensive removal of the chest wall, or wide opening of the pleura. Brauer suggested as a further cause of the increasing cyanosis and dyspnœa in these conditions that during expiration air from the sound lung was forced into the collapsed lung and during inspiration it was drawn back into the sound lung—becoming thus increasingly impure—a condition to which he gave the name of "pendulluft." Other factors in the bad effects of a widely open pneumothorax are the embarrassment of the heart, due to the flapping mediastinum, the disturbance of the pulmonary circulation induced by collapse of the lung, leading to a rise of systemic venous pressure as shown by Sauerbruch. The rapid loss of heat, also demonstrated by Sauerbruch, which is much greater than that caused by opening the abdominal cavity to an equivalent extent, is also a factor to be remembered.

It has long been known that these alarming effects of a suddenly developed open pneumothorax can easily be alleviated. Hewson as long ago as 1767 showed that blocking or closure of the opening rapidly lessened the dyspnœa. Sir William Macewen in his Cavendish lecture in 1906 advised turning the patient so that the opening of the pleura occupies the lowest position in the thorax. Closure of sucking thoracic wounds was early recommended in the surgery of the

recent war. Seizing the collapsed lung with forceps and bringing it towards the wound gives rapid relief. This is described in a dramatic account of a case of operation for sarcoma of the ribs by W. Müller [23] in 1893. An accidental hole was made in the pleura and the tumour sank into the pleural cavity. The lung at once collapsed and the patient appeared almost moribund. On pulling up the lung it filled with air and the grave symptoms disappeared. Other ways of preventing these symptoms are by the modern methods of anæsthesia with positive intratracheal pressure. Murphy showed in an interesting manner how little increase of pressure in the trachea was necessary to cause the collapsed lung to expand, and even to protrude through the opening in the chest wall, thus explaining why hernia of the lung instead of collapse can sometimes occur in chest wounds.

So far there is general agreement as to the effects of open pneumothorax. We can now consider some controversial matters. It is often stated that a small external opening can be made into the pleura without collapse occurring. To account for this a cohesive force analogous to capillarity was assumed and was strongly urged by Dr. Samuel West [24] on the basis of some experiments he made. Sir William Macewen accepted this explanation. More recent observations fail to substantiate this. Northrup,[25] in 1890, found experimentally in animals that collapse occurred even with a pinhole perforation. Emerson also brought forward experimental evidence against this cohesive force. Murphy, from the standpoint of the surgeon, stated in 1898 that he had never found the lung in contact even after a pinhole perforation. It is probable, therefore, that where collapse does not occur at once local or adjacent adhesions are the factors preventing the collapse. It is obvious that pleural adhesion, or thickening, rigidity, and adhesion of the mediastinal tissues must greatly influence the effects of external openings into the pleural space. The frequency of these adhesions in disease no doubt accounts for the fact that in the past, even before tracheal insufflation methods of anæsthesia, surgeons have been able to carry out extensive operations involving opening of the pleura, empyema operations especially.

Evarts A. Graham,[26] whose wide operative experience and carefully devised experiments invest his opinions with great weight, stresses the importance of regarding the mediastinum as a yielding rather than as a rigid partition, and therefore alteration of the intrapleural pressure relations on the opened side must produce changes on the opposite or normal side. In some animals, such as the dog, the mediastinal pleura is so thin that it frequently perforates when air is introduced into one pleura, and a double pneumothorax results. This has occasionally occurred in man. Duval [27] and Matas [28] at one time both suggested that there was a communication between the two pleural cavities in the dog—a view they have now abandoned. Even in man there are two relatively weak or unsupported areas in the mediastinal septum—viz., an upper one in front between the first to the third ribs, where the two pleuræ are in close apposition; the lower one is behind between the fifth and tenth dorsal vertebræ.

The former of these is of some importance since in cases of artificial pneumothorax treatment, unless the pressures used are carefully controlled, a bulge or hernia of the mediastinum may occur from the treated to the sound side. Brauer has recorded one case affecting the second of these weaker spots.

Graham maintains that in open pneumothorax the "vital capacity" plays a very important part. It is obvious that with an opening in the chest wall the open pleura and the sound lung compete for the air drawn in by the respiratory movements. If the pleural opening is so wide or the vital capacity so much reduced that the inspiratory input into the lung is below the normal tidal air requirements, death must result from asphyxia. Graham has worked out a mathematical equation by which, if the vital capacity is known, the size of the maximum pleural opening consistent with life can be calculated. Duval has criticised these views and does not associate the size of the opening with the risk of fatal asphyxia. He even advocates a large pleural incision, provided that measures are taken to ensure complete collapse of the lung. The discussion is rather of academic than of practical interest since the introduction of intratracheal methods of administering anæsthetics, but on the whole the balance of evidence seems in favour of Graham's views. The size of opening is also of special interest in regard to bilateral pneumothorax. That life was possible when both pleural cavities were opened by small punctures was demonstrated by Cruveilhier in 1836, and this has been repeatedly confirmed since.

The determination of "vital capacity" seems likely to become a matter of increasing importance in regard to operative procedures on the thoracic organs. The vital capacity is defined as the amount of air which can be expired by the deepest possible expiration after the deepest possible inspiration. The "tidal air" is usually from 500–600 c.cm., while the "vital capacity" varies from 4000–5000 c.cm. in male, 2500–4000 in woman, or more in people of large build or athletic habits. Many papers have been published on this subject, notably by Peabody and Wentworth,[29] Dreyer [30] and Yates.[31] There is a marked lowering of the vital capacity in various pleural conditions, in pulmonary tuberculosis, and in cardiac conditions.

Meltzer has pointed out the great, indeed almost prodigal, reserve afforded by Nature in regard to most vital organs. Life can be maintained by one-sixth, possibly by one-eleventh of the total lung area. The ratio of the normal vital capacity to the tidal air which may be regarded as the ultimate minimum of respiratory ventilation, is a striking example. Graham's contention is that in disease, if vital capacity becomes reduced to somewhere near the level of the tidal air, any further reduction becomes dangerous or fatal. He believes that some of the serious symptoms in therapeutic pneumothorax may be due to too much pressure reducing the vital capacity to a serious or fatal level. Determination of vital capacity may clearly be an important or even a crucial factor in negativing surgical treatment.

Improved Methods of Diagnosis.

It is a singular and an arresting fact that the incursions of surgery into the various departments of medicine have almost invariably resulted in improvements and even refinements in diagnosis, and not infrequently in advances in strictly medical forms of treatment. The surgeon demands as great accuracy as possible in topographical diagnosis, and he usually requires also an assessment of the degree of functional impairment of the diseased organ. At any rate, in regard to any vital or essential organ he needs to know if the mechanical measures he employs, whether removal, displacement or compression, will leave sufficient normally acting tissue to maintain life, with some reserve in case of special demands. Before calling in surgical aid, it is therefore the duty of the physician to investigate his cases in such a way that he may be able to answer as fully as possible the questions the surgeon may ask. It is true that the ultimate and final investigation may involve exploratory surgical procedures, but in the first instance the responsibility of initiating surgical treatment depends, and should always depend, upon the physician. The responsibility for the ultimate procedures adopted must, however, be shared by the surgeon as well as the physician.

Diseased conditions within the chest, especially in conditions deep at the base, at the roots, or in the mediastinum, may afford some of the most difficult problems in medical diagnosis. After the most careful study of the history, the symptoms and the physical signs, it not infrequently happens that only a tentative diagnosis can be arrived at, or a choice of several. It is fortunate therefore that the developments of laboratory and instrumental methods have yielded aid as great as, if indeed not greater than, in the

case of disease of other systems. It is necessary to emphasise, however, that as a matter of routine, the most careful study of the clinical features of the case should be made before the appeal to these special means of diagnosis, in order to obviate misinterpretation, because such methods by themselves may be as equivocal in their indications as clinical investigation alone. It is also desirable to spare the patient avoidable disturbance and unnecessary expense.

The chief special methods available are: (1) radiological; (2) bronchoscopic; (3) thoracoscopic; (4) clinical laboratory methods, including physical, chemical, histological, and bacteriological investigations.

Radiological Methods.

It would be difficult to exaggerate the value of the assistance given by X ray methods in the investigation of chest disease, particularly since the introduction of the method employing the tube at a distance of 4–6 feet to avoid distortion. Stereoscopic radiograms are also sometimes of great value in establishing the depth of the abnormal condition seen, and its position relative to other structures. For mediastinal conditions, oblique views may afford great assistance, while especially in regard to abscess, bronchiectasis and growth, a true or "dead" lateral view may give information of crucial diagnostic importance and be of more value than stereoscopic methods. The lordotic position is also helpful for bringing mediastinal interlobar effusions into view. It is not too much to say that artificial pneumothorax treatment should not be undertaken, except in emergency induction for hæmoptysis, unless full radiological investigation has been carried out, and unless the progress of treatment can be controlled by re-examination from time to time. Thoracoplasty without preliminary X ray examination is never justifiable in these days. Great as have been the gifts of radiology to the advancement of diagnosis and treatment in chest diseases, they have been notably increased by the use of lipiodol as employed by Sicard and Forestier[32] since 1922. Its special value is that it enables the bronchi to be mapped out with accuracy to their finest ramifications. Lipiodol is a special preparation of iodine and poppy-seed oil. It is not irritating, though it contains 40 per cent. of iodine, and as a rule it does not lead to the ordinary symptoms of iodism, except in persons hypersensitive to it, unless it reaches the alimentary tract. Every precaution should therefore be taken to avoid this mischance. Its use is now so general as to be almost a routine in cases of bronchiectasis and chronic abscess. Full details of the various methods of administration and of its use in diagnosis are given in the admirable little book recently published by Dr. F. G. Chandler and Dr. W. Burton Wood.[33] Amounts varying from 5–40 c.cm. are used, usually by injection through the crico-thyroid membrane or between two rings of the trachea. Ballon and Ballon, and Singer,[34] also give useful practical descriptions. The skin is first anæsthetised with novocaine, and the same substance is slowly injected into the trachea. Preliminary tests as to undue sensitiveness to novocaine and iodine should usually be made. The lipiodol, warmed to 100° F., is injected in a special syringe, after it is made certain that the nozzle of the needle is in the trachea and after the position of the patient has been adjusted so that the lipiodol can reach the side selected by gravity. Every effort should be made by the patient to avoid coughing before the films are taken, as the lipiodol may spread widely into the alveoli and the value of the resulting films be diminished or even vitiated. Incidentally such films, taken after cough, suggest clearly how in disease, infected material may be spread widely throughout the lung by cough. Other methods of introducing lipiodol are through the glottis with the aid of a laryngoscope, by injection through a bronchoscope, a catheter, or an intubation tube, and by an oral method described by Singer,[34] in which with the tongue held forward, lipiodol is injected over the base of the tongue and allowed to flow into the larynx. The indications, contra-indications, and dangers are clearly summarised by Chandler and Wood. From my own experience I have found it of the greatest value in confirming and establishing the diagnosis of bronchiectasis, in determining whether this condition is localised or bilateral, and in distinguishing between it and abscess, a matter of great difficulty in many cases. In abscess, lipiodol as a rule does not enter the cavity, because the lumen of the bronchus with which it communicates is usually obstructed by œdema or by granulation tissue. It demonstrates obstruction of bronchi by growth or pressure. It enables the bronchial tree to be demonstrated in some cases where an ordinary X ray gives little or no information owing to dense pleural thickening or widespread fibrosis. It can also be used to demonstrate the extent of pleural sinuses or fistulæ, although in cases of bronchial fistula it may not necessarily reach the pleura from the bronchial route. Although it usually demonstrates a cavity produced by tuberculous disease admirably, its use for this purpose is contra-indicated as a rule, especially if there be any activity of the disease. Other contra-indications are fever of any degree and marked iodine hypersensitiveness. Chandler and Wood rightly condemn its use in grossly septic conditions of the lung.

The X ray expert should usually be consulted in regard to the interpretation of the appearances yielded by his screen and film examinations, especially where he has a wide experience of chest examinations. His expert interpretation of the appearances, in the light of the clinical findings, which he should invariably be given, may be of the greatest assistance, whereas an interpretation of the X ray appearance alone may be misleading. In other words, his opinion may carry great weight in regard to the decision between alternative diagnoses. I have frequently to acknowledge with gratitude the assistance given me by radiologists in this matter. Time spent in consultation in the dark room, especially if the surgeon be also present, is usually time well spent.

Bronchoscopy.

Bronchoscopy has established itself as a valuable method of diagnosis and treatment in intrathoracic conditions, and its usefulness is not confined to diseased conditions of the trachea and bronchi. Its employment in regard to foreign bodies is now a commonplace, owing to the classical work of Chevalier Jackson. It would now appear that the thoracic surgeon must needs become an expert with the bronchoscope, or include a bronchoscopist in his team, since this instrument can give information of great importance in regard to abscess, bronchiectasis, bronchial obstruction from cicatrisation, pressure or growth, and in regard to tumours originating in the bronchi. To its use in treatment I shall refer later.

Thoracoscopy.

The introduction by Jacobaeus[35] in 1913 of the thoracoscope enabled the conditions within the pleura to be seen clearly after a preliminary artificial pneumothorax, notably such conditions as adhesions and pleural growths. It has also enabled the situation and relations of new growths of the lung and mediastinum to be studied, and it may be a useful preliminary to more active surgical measures of treatment in such cases. An improved form of the instrument has been described by Unverricht.[36]

Clinical Laboratory Methods.

These should be utilised fully. Sputum examinations should always be carried out and repeated with special precautions or special methods where necessary. Not only the tubercle bacillus and other pathogenic organisms, but also anaerobic saprophytes and organisms such as various spirochætes may be found and give indications for treatment. The possibility of streptotrichosis, blastomycosis, and other mould or fungus infection should be borne in mind in obscure

febrile destructive pulmonary diseases. Careful cytological and bacteriological examination of pus and other exudates as well as of the sputum may also give diagnostic information of value.

Biochemical methods may serve an ancillary function, notably in regard to calcium content, blood-sugar, blood-urea, and non-protein nitrogen estimations, which may be considered in assessing the suitability of a doubtful case. Blood counts, showing leucocytosis, may suggest pleural or pulmonary suppuration, or an eosinophilia may give valuable suggestions as to the presence of hydatid or other protozoal disease.

Complement-fixation tests may give information in regard to syphilis, tuberculosis, or hydatid disease. Another test which sometimes gives useful information, especially in regard to tuberculosis, is the "sedimentation rate" of the red corpuscles. It is of little value, if any, in diagnosis, but as a prognostic aid it seems likely to be of use. The value of the test is vitiated by the fact that the sedimentation rate is lowered in a variety of conditions other than tuberculosis. It has therefore at present only a relative value. At the same time, a persistently low rate is in my experience of grave significance, and a rising level as a result of treatment is an encouraging sign. It is markedly lowered in pleurisy and it shows a notable improvement in cases of artificial pneumothorax progressing favourably from the clinical standpoint.

Selection of Cases and Pre-operative Preparation.

The surgery of the chest should in nearly all cases be deliberate and unhurried. Emergency operations are exceptional and are practically confined to: (1) relief of tension in valvular pneumothorax; (2) partial aspiration of a large effusion causing dangerous pressure on the contralateral lung or leading to acute œdema of that lung; (3) immediate artificial pneumothorax in cases of grave and repeated hæmoptysis; (4) tracheotomy in bilateral abductor paralysis from pressure on both recurrent laryngeal nerves, a rare but well-recognised cause of urgent dyspnœa; (5) aspiration of a large and neglected empyema in a very gravely ill patient preparatory to operation by thoracotomy.

In nearly all other cases there is time for the most meticulous examination, and for all the necessary special investigations such as those mentioned in the previous section. The appeal to surgery should be made only after it is clear that medical measures are doomed to failure. On the other hand, in such cases the decision should be made as early as possible and certainly before the patient has become so debilitated that the risk of shock from operation outweighs the chances of success. Such delay is not fair either to the patient or the surgeon. On the other hand, the operative mortality from some of the more severe operations, particularly lobectomy, is considerable. The decision as to operation may therefore require a careful balance of the prognosis of the condition if untreated, with the immediate risks of operation, and the chances of ultimate success.

The mortality of these operations is steadily diminishing in expert hands, and is likely to do so progressively as surgical technique becomes more and more developed and the selection of cases becomes more eclectic. The preparation of the patient varies somewhat in the practice of individual surgeons. Most of them insist upon rest in bed under careful observation for from seven to ten days before such an operation as thoracoplasty or lobectomy. This often serves to establish relations of esteem and confidence between surgeon and patient, which may be of the utmost value. If there be any evidence of any catarrhal process such as coryza or bronchitis or any serious digestive upset, the operation is postponed. The condition of the mouth and nose is investigated, as any serious oronasal sepsis is a contra-indication. Purulent affections of the nasal sinuses naturally involve special risk. If there is marked anæmia a blood transfusion may be given. If the blood pressure is low—e.g., much under 120—attempts should be made to raise it, but a low pressure does not negative operation. Morriston Davies gives a course of tablets of suprarenal extract for ten days beforehand. Glucose is frequently given for a few days both by the mouth and with rectal saline injections. Alexander recommends digitalis if there is any cardiac weakness. Lilienthal suggests an investigation of the coagulation time beforehand, and if it is too long appropriate measures should be taken.

Before any operation for a condition with cavitation or dilated tubes, the utmost care is taken to promote expectoration before operation by expectorants and by "tipping" or change of posture. The strictest attention to details of this kind may make the difference between success and failure.

Developments in Anæsthesia.

The problem of anæsthesia in patients with disease of the chest has always been a difficult one, especially in regard to conditions like pulmonary tuberculosis, empyema, and any condition involving opening of the pleura. It is well recognised that in latent or quiescent tuberculosis general anæsthesia induced by chloroform or ether, or by mixtures of these substances, may be followed not infrequently by definite activity of the lung lesions, with more or less prolonged febrile exacerbations. For this reason it is advisable in operations on patients with pulmonary tuberculosis to employ local or regional anæsthesia when possible, and to use gas and oxygen rather than chloroform or ether for cases where general anæsthesia is essential. These facts account for the diversity of practice of chest surgeons in regard to the use of local or general anæsthesia.

There can be no doubt that the developments of local and regional anæsthesia have been of the greatest service in chest surgery, by lessening shock and post-operative pain and by enabling operations such as opening an empyema to be done with safety in patients seriously ill where a general anæsthetic would be dangerous, and this applies to children as well as to adults.

The fear of open pneumothorax led to the introduction of differential pressure methods of administering general anæsthetics. The first of these was introduced by Sauerbruch in 1904 at the instigation of Mikulicz. It was a small negative pressure chamber in which the surgeon and his assistants worked, the head of the patient being outside and his body inside, and the anæsthetic was given at atmospheric pressure. The pressure within the room was kept at 8 to 10 mm. Hg below the atmospheric pressure.

Positive pressure chambers were used, especially by Brauer, the conditions being reversed, the patient's body and the surgeon being in a room at atmospheric pressure, while the patient's head and the anæsthetist were in a small chamber at a slightly raised pressure. A similar result was obtained by various forms of mask.

These methods, though interesting historically, are now practically obsolete, since the striking researches of Meltzer and Auer in 1909. They showed that life could be maintained by the intratracheal administration of air in animals, even after all normal respiratory movements were abolished by curare, and after double open pneumothorax. It is interesting in this connexion to note that Vesalius in 1560 was aware that life could be maintained in this way and that it was again observed in 1667 by Robert Hook, who used bellows to supply the air. Elsberg,[37] in 1911, seems to have been the first to apply the intratracheal insufflation method of anæsthesia to the human subject. He was followed in this country by Kelly in 1912.[38] Cotton and Boothby,[39] in 1913, first showed that gas and oxygen could be administered in this manner, a demonstration which materially extended the possible applications of surgery to tuberculous patients.

There are now many ingenious forms of apparatus by which the anæsthetist is able to control the exact percentages of gas and oxygen, or of ether and air, supplied, and to vary the pressure at which the mixture is delivered into the trachea. He is thus able, at the

request of the surgeon, to deflate or inflate the lung on the opened side, while maintaining adequate ventilation of the sound lung and complete anæsthesia. It is often stated that gas and oxygen administration is followed by shock. This is not our experience at the Brompton Hospital, as it is administered by Dr. J. W. Magill.

The technique of anæsthesia, induced and maintained by an expert in these methods in a severe operation on the chest of a patient often weak and ill from prolonged disease, compels admiration in its orderly and almost perfect adaptation to the needs of the surgeon.

Improved Technique and After-care.

Time, the lessening of shock, and the prevention of too long exposure are factors of the utmost importance in thoracic surgery. Lilienthal [40] states that "rarely will a patient recover after an operation lasting more than 40 minutes of wide exposure." The ingenuity and attention devoted to the production of special instruments for removing the periosteum from the ribs and for their cutting are all striking, as are also time-saving details in the operative technique developed individually by surgeons in their practice. Equally important to the surgeon is the organisation of his team of assistants. Efficient, experienced, prompt, and purposive help are greatly saving of time. Mr. Morriston Davies tells me that he is so convinced that loss of heat is an important factor in shock that he keeps the operating theatre at a minimum temperature of 80° F. for thoracoplastic operations.

The after-care, especially in regard to the dressing applied and the degree of pressure exerted by it in cases of thoracoplasty, and the special nursing arrangements required by these patients, especially in regard to position in bed, cough, and expectoration, are all vitally important.

The Aims and Methods of Surgery in Diseases of the Chest.

Limitations imposed by time and my own lack of experience of the effects of surgery of the œsophagus, the heart, and the great vessels, compel me to restrict my review to the applications of surgery to diseases of the bronchi, lungs, pleuræ, and mediastinum.

We may now consider what help surgery can offer to the physician in the treatment of cases of chest disease. Almost before the dawn of the modern applications of surgery to this branch of medicine, Glück [41] wrote "ubi hæmorrhagia, ibi ligatura, ubi tumor, ibi extirpatio, ubi pus, ibi incisio," a pronouncement epigrammatic and terse, if hardly classical. Unfortunately his recommendations are, as we now know, often impracticable.

The chief ways in which surgery can aid in disease or damage of the structures in the chest are: (1) By securing rest to the part involved, particularly in disease of one lung. (2) By evacuating abnormal exudates, whether serous, purulent, hæmorrhagic, or chylous, at the right time and in the most effective manner. (3) By removing foreign bodies. (4) By collapsing cavities. (5) By excision or extirpation of growths or cysts of the bronchi, lungs, pleura, or mediastinum when practicable. (6) By the removal of diseased or damaged lung tissue which is beyond hope of repair, if it is sufficiently localised. (7) By decompression, where intrathoracic pressure relations are disturbed. (8) By exploratory thoracotomy to discover whether radical surgical measures are practicable in obscure lung conditions.

The chief measures designed to these ends may be enumerated: (1) Those designed to produce collapse or compression of diseased lung tissue: (*a*) Artificial or therapeutic pneumothorax. (*b*) Cutting adhesions where these prevent complete or effective collapse, a procedure sometimes dignified by the misleading name of "intrapleural pneumolysis." (*c*) Thoracoplasty, especially the posterior paravertical operation of Sauerbruch. (*d*) Extrapleural pneumolysis—packing by various tissues or extraneous substances to complete the compression of the lung where thoracoplasty alone is insufficient, more especially at the apex—then called apicolysis. (*e*) Phrenic paralysis, either temporary—phrenicotomy, or permanent—phrenic evulsion or exairesis.

(2) Evacuation of exudates is not always a matter of mere paracentesis or incision. The fear of open pneumothorax has given place to the more real anxiety to avoid widespread infection of the pleura. Some intrapulmonary collections are more safely evacuated through the bronchi by induced collapse, others by bronchoscopic washing out, and others by a two-stage thoracotomy and pleurotomy, the first stage to produce pleural adhesion, the second to incise the lung.

(3) Foreign bodies may be removed through the bronchoscope, or if this fails or is impracticable, by thoracotomy. The main bronchi can be reached by an extrapleural route, the divisions only by actual pneumotomy.

(4) New growths of the bronchi of simple character may be removed through the bronchoscope. Growths in the lung, if operable, usually involve removal of part of the lung—lobectomy. Growths in the mediastinum may be dealt with either by a trans-pleural route after a preliminary pneumothorax or by a direct thoracotomy involving removal of several pieces of rib. A trans-sternal route of approach is also often valuable.

(5) For the removal of diseased or damaged lung, the operation of lobectomy is theoretically the operation of choice, and this operation will be discussed in connexion with bronchiectasis and new growth.

(6) Measures to secure decompression or relief of increased thoracic pressure, either pleural or mediastinal: (*a*) withdrawal of air or fluid by paracentesis; (*b*) removal of ribs or cartilages as in Brauer's operation of cardiolysis for adherent pericardium. It is suggested that a similar procedure may in rare cases be helpful in cases of raised intrathoracic pressure from inoperable growths. Here, again, a trans-sternal or sternum-splitting operation may be helpful.

(7) Exploratory thoracoscopy as introduced by Jacobaeus is sometimes useful, but seems likely to be displaced by exploratory thoracotomy, which enables a more complete investigation to be made.

The principle of pulmonary collapse which is the basis of artificial pneumothorax treatment, and of some of the chief surgical procedures, is so fundamental that it is worth while to study briefly what effects it can produce.

In collapse by artificial pneumothorax the lung is allowed at first to retract away from the chest wall by its own elasticity, and later, if necessary, it can be compressed against the mediastinum by positive pressure. It thus becomes collapsed and airless, while cavities and dilated tubes are emptied. It has been shown by Bruns that the collapsed lung contains less blood and that the amount of blood circulating through it is diminished. As a necessary consequence the blood-flow through the uncollapsed lung is increased and a compensatory hypertrophy of the right ventricle develops. Graetz,[42] Shingu,[43] and others have shown that there is lymph stasis with dilatation of the lymph-vessels. Leroy Gardner [44] has demonstrated that this dilatation occurs at the periphery, with obliteration in the centre. If collapse is long maintained, a general increase of fibrous tissue may result, though this is not invariable. Caseous areas may be partly dried up and partly discharged by the bronchi, and not infrequently they become calcified. Cavities may disappear owing to falling in and coalescence of their walls. The pleura may be greatly thickened after prolonged collapse and fibrous bands may extend from it into the lung tissue. There is often marked fibrous thickening of the walls of the blood-vessels and bronchi. In spite of considerably advanced fibrosis, complete or partial expansion can occur when the treatment is terminated, even after several years'

collapse. At times, however, the lung fails to expand, and in such cases surgical aid may be required.

In thoracoplasty similar changes occur, though they are produced by allowing the chest wall to fall back upon the lung, more or less completely immobilising it but not obtaining such a complete collapse. On the other hand, it is a permanent deflation of the lung, and is maintained by the thickening of the pleura and by the new growth of bone from the periosteum stripped up from the sections of ribs removed.

It is important to note that both procedures may promote emptying of cavities, either pulmonary or bronchiectatic, though closure of the latter does not usually result. Indeed, after the use of lipiodol in bronchiectatic cases it is wise to allow time for this to be largely evacuated before collapse is induced, otherwise it may be pent up. It is significant in this connexion that in one of my cases of bronchiectasis at present at Frimley convalescing after thoracoplasty, the operation reduced the sputum from 20 ounces to 4 drachms in the day, yet when he was tightly strapped because of some pain he brought up 10 ounces of sputum within the next day.

The beneficial effects of these collapse forms of treatment comprise far more than the mere mechanical effects just described. Some immediate reactive changes often occur, especially after thoracoplasty, leading sometimes to febrile reaction and temporary loss of weight; this is soon followed in successful cases by a remarkable improvement in the general condition of the patient and by abatement and eventual disappearance of symptoms such as cough, fever, and night sweats. In other words, the toxæmic features become abolished. This is explained by the relative lymph stasis and by the cessation of movements of the lung, giving less opportunity for the absorption of the toxic products of bacterial activities. This in turn helps to improve the local condition, since the immunity processes are less swamped by these toxic products.

In my next lecture I propose to consider the applications of surgical methods to diseases of the lungs and bronchi.

References.

1. Holinshed's Chronicles of England, 1808, iv., 496 and 534.
2. Munk's Roll of the Royal College of Physicians, 2nd ed., 1878, iii., 352.
3. National Dictionary of Biography, London, 1893, xxxiv., 272.
4. Carson, J.: Phil. Trans. Roy. Soc., 1820, Part I., p. 29. Also Essays Physiological and Practical, Liverpool, 1822.
5. Cayley, W.: Trans. Clin. Soc. of London, 1885, xviii., 278.
6. Hastings J., and Storks, R.: Lond. Med. Gaz., Dec. 20th, 1844.
7. Lowson D.: Brit. Med. Jour., 1893, i., 1152.
8. Macewen, W.: Lond. Med. Jour., July, 1906; Brit. Med. Jour., 1906, ii., 2375.
9. Davies, H. Morriston: Surgery of the Lung and Pleura. London, 1919. Tubercle, 1923, v., 1.
10. Elliott, T. R.: History of the Great War. Surgery of the War, i., 345.
11. Gull, W.: Guy's Hospital Reports, 1857, p. 262.
12. Donders, F. C.: Zeit. f. rationelle Med., 1853 N. F., iii., 290.
13. Aron: Die Mechanik und Therapie des Pneumothorax, 1902.
14. Emerson, C. P.: Johns Hopkins Hosp. Reports, 1903, xi., 1.
15. Itard, M.: Thèse de Paris, 1803.
16. Hewson, W.: Medical Observations and Inquiries, 1767, iii.
17. Quoted by Elliott (ref. 10).
18. Powell, R. D.: Med. Times and Gaz., Jan. 30th, 1869, and Feb. 13th, 1869, p. 113.
19. Davy, J.: Phil. Trans., 1823–1824.
20. Johnson, J.: Lond. Med. Gaz., 1829, iii.
21. Unverricht: Zeit. f. Klin Med., 1879, i., 550.
22. Murphy, J. B.: Jour. Amer. Med. Assoc., 1898, xxxi., 151.
23. Müller, W.: Deut. Zeit. f. Chir., 1893, xxxvii., 40.
24. West, S.: Diseases of Organs of Respiration, London, 1902, ii., 776.
25. Northrup: Researches of the Loomis Lab., Univ. of New York, 1890, No. 1.
26. Graham, E. A.: Lilienthal's Thoracic Surgery (ref. 40), 1925, i., 93; also Graham and Bell, R. D.: Amer. Jour. Med. Sci., 1918, cliv., 839.
27. Duval, P.: Presse Méd., 1923, lxviii., 733.
28. Matas, R.: Arch. of Surg., 1924, viii., 336.
29. Peabody, F. W., and Wentworth, J. A.: Arch. Int., Med., 1917, xx., 463.
30. Dreyer, G.: THE LANCET, 1919, ii., 227.
31. Yates, J. L.: Arch. of Surg., 1925, x., 477.
32. Sicard, J. A., and Forestier, J.: Bull. et Mém. Soc. Méd. des Hôp. de Paris, 3 ième, 3 sér, 1922, p. 463.

(*Continued at foot of next column.*)

OBSERVATIONS ON THE LOCALISATION OF INTRACRANIAL TUMOURS.

THE DISCLOSURE OF LOCALISING SIGNS FOLLOWING DECOMPRESSION OR VENTRICULOGRAPHY.

By HUGH CAIRNS, M.B., F.R.C.S. Eng.,

ASSISTANT SURGEON TO THE LONDON HOSPITAL; LATE ASSISTANT RESIDENT SURGEON, THE PETER BENT BRIGHAM HOSPITAL, BOSTON, U.S.A.

No one can have experience of intracranial surgery without perceiving how difficult it may be to localise an intracranial tumour, and how often operation is performed without the tumour being found. The object of this paper is to show that surgical intervention which falls short of removal of the tumour may so alter the signs and symptoms of the tumour as to enable a more accurate localisation of its position to be made. Changes of a similar nature sometimes occur in cases of tumour of the spinal cord after lumbar puncture has been performed. These are easy to interpret and may therefore be conveniently considered before the more complicated changes that attend surgical interference in cases of intracranial tumour.

The Effect of Lumbar Puncture in Spinal Cord Tumours.

It is well known that withdrawal of cerebro-spinal fluid by lumbar puncture may aggravate the signs and symptoms of a spinal cord tumour. The example may be quoted of an elderly lady who was carried into the Peter Bent Brigham Hospital suffering from paralysis of both legs. For the previous seven months she had complained of increasing weakness of the right leg, but she had been able to walk without assistance until one week before admission when, following a lumbar puncture, her legs became completely paralysed. At operation Dr. Cushing removed an intradural meningioma from alongside the mid-thoracic spinal cord and the patient made a complete recovery.

There is little doubt that in this case the withdrawal of cerebro-spinal fluid by lumbar puncture was directly responsible for the great increase of physical signs, thus converting an uncertain clinical picture into one of obvious spinal cord tumour. Presumably the withdrawal of spinal fluid so altered the position of the tumour as to produce a greater degree of pressure on the spinal cord, or on its blood-supply, with resulting loss of function.

It is thus seen that lumbar puncture, which might be termed a "minor injury" of the nervous system, is of value in diagnosis of tumours of the spinal cord, not only because it frequently reveals characteristic changes in the spinal fluid, but also because it may so aggravate the pre-existing signs and symptoms as to produce a clinical picture which is easily recognised as one pertaining to tumour. The changes which follow lumbar puncture may be much less prominent than those which occurred in the case of the old lady, and it is therefore important that after lumbar puncture in cases of suspected spinal cord tumour we should deliberately repeat the neurological examination in order to search for an extension of the physical signs. Increase in the signs may be taken as evidence of the presence of a tumour.

Dr. R. A. Young: References.

(*Continued from previous column.*)

33. Chandler, F. G., and Wood, W. B.: Lipiodol in the Diagnosis of Thoracic Disease, London, 1928.
34. Singer, J. J.: Arch. of Surg., 1927, xiv., 167.
35. Jacobaeus, H. C.: Beiträge z. Klin. d. Tub., 1912, xxv., 185.
36. Unverricht: Beiträge z. Klin. d. Tub., 1923, lv., 296.
37. Elsberg, C. A.: Ann. of Surgery, 1911, liii., 161.
38. Kelly, R. E.: Brit. Med. Jour., 1912, ii., 112.
39. Cotton, F. J., and Boothby, W. M.: Ann. of Surgery, 1913, lvii., 42.
40. Lilienthal, H. Thoracic Surgery, Philadelphia and London, 1925, i., 6.
41. Quoted in Stephen Paget's Surgery of the Chest, Bristol, 1896, p. 443.
42. Graetz, F.: Beiträge z. Klin. d. Tub., 1908, x., 249.
43. Shingu, S.: Ibid., 1908, xi., 1.
44. Gardner, L. U.: Amer. Rev. of Tub., 1924–25, x., 501.

Observations of this nature have been made by numerous workers in the past, notably by Elsberg.[1] That analogous changes may be observed in cases of intracranial tumour does not seem to have been so generally recognised, yet it is clear from the examples presently to be described that such changes do occur and that they may become a vital factor in the successful conduct of any one case.

What forms of injury are likely to aggravate the signs and symptoms of an intracranial tumour? Withdrawal of cerebro-spinal fluid by lumbar puncture will often do so, but to such extent that it may produce sudden death, and for this reason lumbar puncture is held to be dangerous in all cases of suspected intracranial tumour that show signs of hydrocephalus. The mechanism of herniation of the cerebellar tonsils and medulla oblongata through the foramen magnum, which is responsible for the fatalities after lumbar puncture, is well known, and therefore need not be elaborated here. The surgical procedure which more commonly than all others is seen to aggravate the signs of intracranial tumour is an osteoplastic exploration that fails to disclose the tumour. This is known in neuro-surgical parlance as "the negative exploration."

The Negative Intracranial Exploration.

When we consider that an expert neurologist after most thorough clinical examination may be unable to make an accurate diagnosis of the situation of an intracranial tumour, and that many parts of the brain are difficult of access, it is, indeed, not surprising that intracranial tumours are often difficult to find at operation, the more so as only a limited portion of the surface of the brain can be exposed at a single exploratory operation, and the presence of a deep-seated tumour may be easily overlooked. The advent of ventriculography has provided us with an additional diagnostic weapon of great importance, yet this procedure is not so free from danger that it can ever supersede the exhaustive clinical investigations upon which we have hitherto based our efforts to localise intracranial tumours, and there are many cases of unlocalised tumour associated with great rise of intracranial pressure in which its use is definitely contraindicated. In such cases the method of ventricular estimation[2] may be used as an aid to diagnosis, but it not infrequently happens that a fairly confident opinion as to the situation of the tumour is formed on the history and physical signs alone, and the surgeon, without resorting to ventricular estimation, explores part of the brain by turning down an osteoplastic flap and fails to find the tumour. He may then seek to reduce the raised intracranial pressure by leaving a decompression, and in this way many patients with intracranial tumours are temporarily relieved of their symptoms even though the tumour has not been removed. Experience teaches, however, that certain patients become definitely worse. This change for the worse that may follow a negative exploration and decompression has in the past played havoc with the peace of mind of those who have attempted neurological surgery, and one operator of experience has confessed to me that whenever he had performed a craniotomy without discovering the tumour he dreaded to approach the bedside on the following day for fear of finding that his patient had become afflicted with hemiplegia, aphasia, or some other symptom that was not present before operation.

While in the past this aggravation of symptoms after a negative exploration and decompression was frequently due to gross injury of the brain at the time of operation, or to the formation of a post-operative clot, we are now, thanks largely to the work of Prof. Harvey Cushing, possessed of an operative technique so delicate that injury of the brain at operation can be avoided by all those who have the patience to master and employ the appropriate methods. If we may assume that the brain has been treated with proper gentleness at operation, and that the field of operation has been left dry, it is almost certain that any new signs and symptoms that make their appearance after operation must be due to alteration in the position or size of the tumour, occasioned by release of pressure in one part of the intracranial chamber. This obvious inference and all that it implies does not appear to have received in the past the attention that it deserves. Its importance was impressed on me by several cases that I saw during a year's experience as assistant resident surgeon to Dr. Cushing, and particularly by the following case.

A Case Related.

The patient was a young woman, aged 20, admitted to the Peter Bent Brigham Hospital on Nov. 22nd, 1926.

Clinical History.—Her illness had begun nearly six years before with fleeting attacks of numbness of the right side of the body. These were followed by "fainting spells" and, within a year, by generalised convulsions. After each convulsion she would have violent headache, mostly occipital, and vomiting for two to three days.

For eight months she had noticed that she could not see to the right, and had experienced a feeling of eye-strain and occasional diplopia. In addition, there had been some unsteadiness in walking and difficulty in swallowing; also some loss of memory.

Examination showed bilateral papilloedema with considerable secondary optic atrophy. There were signs suggesting cerebellar disturbance—namely, nystagmus, generalised hypotonia and ataxia, and staggering gait. But investigation of the visual fields showed complete right homonymous hemianopsia. There was also diminished sensation to pin-prick on the right half of the body. Spontaneous speech was normal, but there was slight difficulty in naming objects. Her speech, however, was examined by several observers, and it was finally concluded that this questionable defect of speech was of no significance.

Diagnosis.—The main signs were right homonymous hemianopsia, signs of cerebellar disorder, and papilloedema. The diagnosis thus lay between tumour of the left temporal and left occipital lobes. Looking back it is difficult now to see how a mistake was made, but at the time the right-sided analgesia was disregarded, and it was considered that absence of muscular weakness and of definite aphasia favoured an occipital location. Occipital tumours and the cerebellar signs produced by them were being made the subject of special study at the time, and probably this weighed unduly in the decision to explore the occipital lobe.

First Operation (Nov. 26th, 1926).—Dr. Cushing reflected an osteoplastic flap to expose the left occipital lobe. The brain protruded and everywhere showed flattening of the convolutions, but there was no sign of tumour. The left lateral ventricle was tapped and appeared to be displaced medially. In closing it was necessary to sacrifice the bone of the flap. During convalescence the patient became obviously dysphasic and also showed marked weakness and spasticity of the right arm and leg, together with impairment of postural sensibility on the right side. These further signs, considered in conjunction with the right homonymous hemianopsia, left no doubt that the tumour was actually situated in the left temporal lobe.

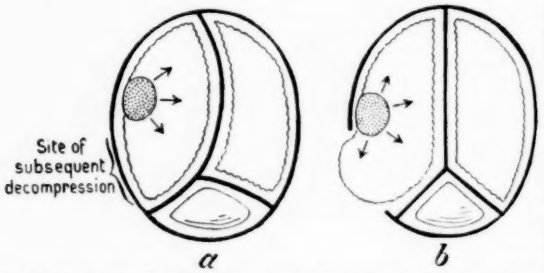
Second Operation (Jan. 6th, 1927).—Dr. Cushing turned down an osteoplastic flap over the middle portion of the left cerebral hemisphere, using the anterior limb of the former occipital exploration as the posterior limb of this new flap. In the cortex of the temporal lobe, and only 2 cm. in front of the area which had been explored at the previous operation, lay a large, soft avascular tumour. Tumour tissue to the size of a hen's egg was removed, mainly by suction. In closing it was again necessary to sacrifice the bone of the flap.

Subsequent Course.—After operation vision and speech improved, the headaches disappeared, and the attacks of unconsciousness became less frequent. On discharge from hospital, however, she still had some motor weakness and sensory loss over the right half of the body, also some difficulty in naming objects. The visual fields had not changed.

Comment on Case 1.

The importance of this case to our present thesis lies in the great increase of physical signs which followed exploration and decompression of the occipital region. A questionable difficulty in naming objects was converted into an obvious dysphasia. Paresis and disturbance of postural sensibility of the right side appeared as new signs. From our knowledge of localisation of cerebral function it is obvious that none of these signs could possibly have been due to local disturbance of the occipital lobe at or

after operation, and the reasonable inference was that they were attributable to a tumour of the left temporal lobe which, as a result of the occipital decompression, had become altered in size or in its relation to the left cerebral hemisphere. The change is represented diagrammatically in the figure. It is



In (*a*) is shown the probable state of affairs before operation. The presence of the tumour results in displacement of the falx cerebri to the opposite side. When the occipital decompression has been made (*b*), the occipital lobe bulges through the decompression. Owing to relief of pressure the falx tends to become straight. In addition the tumour is probably displaced backwards.

possible that withdrawal of fluid from the occipital horn of the left ventricle during the course of the first operation also played some part in the production of the fresh signs.

What happened in this case may occur in other cases where craniotomy has failed to disclose a tumour. After such an operation signs hitherto latent may declare themselves, and it is thus not infrequently possible to make a further and more accurate localisation of the tumour and to repair the original mistake in diagnosis by a second operation. Recognition of this principle has not been sufficiently stressed in the past, and doubtless in many cases its working has been overlooked because of a tendency to cease making neurological examinations once operation has been performed. In many cases the changes are so slight as only to be detected by thorough examination. In other cases the changes are more severe than in the case cited above. The fatal hyperthermia which is so liable to follow in the wake of simple decompression operations for tumours of the brain stem, such as pineal tumours,[3] and suprasellar cysts or adamantinomata,[4] is probably due to a shift in the position of the tumour in its relation to the vegetative centres of the hypothalamus. At present, however, too little is known of temperature control in man to render elaboration of this idea of any value.

It is clear that the possible effect of a shift of the tumour should always be considered when simple decompression operations are performed. When an osteoplastic exploration has been carried out and the tumour has not been found, there should be no relaxation of clinical observation. Almost at once neurological examination may reveal further signs which indicate unmistakably where the tumour lies, and the way will be open to retrieve the life and preserve the well-being of the patient by removal of the tumour at a second operation.

Ventricular Puncture and Ventriculography.

The following case is one of several in which fresh signs and symptoms appeared after replacement of the fluid of one lateral ventricle by air.

CASE 2.—A married woman, aged 45, was admitted to the hospital on April 4th, 1927.

Clinical History.—Her illness began 15 months before admission with loss of energy and initiative. Nine months before admission she began to suffer from headaches in the occiput and back of the neck. At this period her left leg began to drag while she walked, and at times it would give way and she would fall. After a vacation in August, 1926, she became very much better and remained perfectly well, except for an occasional slight headache until February, 1927, when, six weeks before admission, the headaches and weakness of the left leg returned. The leg was so weak that she was unable to stand. Her left hand also became weak, and in it she began to experience attacks of numbness which lasted five minutes. Her speech became slow, and she had difficulty in remembering the names of her friends. Her memory had been failing for about four months before admission. She was right-handed.

Examination.—The patient showed entire lack of anxiety about her condition, and was at times euphoric and subject to outburst of excessive laughing. Occasional incontinence of urine and fæces. Bilateral papilloedema. Slight weakness, slight ataxia and dysmetria of the left arm and leg. Inability to stand. Absence of left abdominal reflexes. Bilateral extensor plantar response.

The case thus appeared to be a fairly obvious tumour of the right frontal lobe, but some doubt was felt about this in view of the fact that sense of smell was impaired on the left side. Further examination also showed occasional weakness of the right side of the face. It was therefore decided to do ventriculography.

Ventriculography.—The left lateral ventricle was tapped through the posterior parietal region; 10 c.cm. of fluid were withdrawn and replaced by a similar amount of air. Thirty minutes after the air was injected, while the ventriculograms were being developed, the right arm was noticed to become extremely weak. There was also distinct weakness of the right side of the face and speech became slurred. The ventriculograms confirmed these recent clinical signs in showing a defect in the anterior horn of the left lateral ventricle.

Operation and Subsequent Course.—Accordingly on the day after ventriculography, the left frontal lobe, instead of the right frontal lobe, was explored. A tumour was found at the anterior pole of the left frontal lobe; over its surface was spread a delicate film of recent blood-clot. The tumour, a glioma, was almost completely removed, and the patient did well. Her mentality became normal, and she was able to walk quite well before her discharge from hospital about three weeks after operation.

Comment on Case 2.

This case affords a good illustration of the way in which a tumour of one frontal lobe may simulate a tumour of the opposite frontal lobe, but we are only concerned here with the alteration of physical signs that followed ventriculography and the manner in which it was produced. In this connexion it is important to note that a thin film of blood-clot was found on the surface of the tumour at operation. This clot was red, easily detached, and therefore evidently recent. There was, however, no reason to suppose that the clot was the result of hæmorrhage during the course of the operation, for there was no injury of the dura during the preparation and reflection of the osteoplastic flap, and the early stages of the operation were without incident. As soon as the flap was raised the clot was visible through the dura mater as a circular bluish-red area. In view of these observations it is probable that the clot was produced at the time of the ventriculography on the previous day. Withdrawal of fluid from the left lateral ventricle prior to the injection of air would tend to cause separation of the frontal lobe from the overlying dura mater, and may thus have resulted in rupture of some delicate vessel passing between dura mater and the surface of the tumour. It is always noticeable at operations that the anterior pole of the frontal lobe, more than any other part of the brain, tends to fall away from the overlying dura mater when the corresponding lateral ventricle is tapped.

Inasmuch as the air was injected into the left lateral ventricle by passage of a brain needle through the left parietal region, it is necessary to inquire whether the weakness of the right arm and face and the slurring of speech which followed within 30 minutes of ventriculography may not have been due to disturbance at the site of tapping in the left parietal lobe. There are no direct observations on this question, since neither the site of puncture nor the track of the brain needle was inspected at the subsequent operation. In a personal experience of ventriculography performed through the parieta

region, I have met with no other case that was followed by symptoms which could be referred to the site of brain puncture, but Dr. John Fulton tells me that he has seen a case in which symptoms occurred. In his case, however, the symptoms were not motor in character as in Case 2, but consisted of numbness and tingling in the opposite hand which came on at the very moment when the needle was being passed through the parietal lobe. In the case under discussion it seems more reasonable to attribute the symptoms that appeared after ventriculography to disturbance of the tumour itself. And the blood-clot which was found at operation on the surface of the tumour probably represents part at least of the disturbance.

The successful diagnosis and, depending so largely on the diagnosis, the successful outcome of this confusing case are to be attributed primarily to information furnished by the ventriculograms themselves, yet interpretation of these was difficult, and valuable evidence was obtained from neurological examination of the patient after the injection of air. Ventriculography intensified the clinical picture so that what had hitherto been nebulous in the light of current neurological knowledge now became clear.

The Misuse of Ventriculography.

It is scarcely necessary to point out that provocation of an intracranial tumour by ventriculography is not a thing to be desired or deliberately sought after. The degree to which the signs and symptoms may be aggravated by injection of air cannot be accurately predicted or controlled, and a certain number of fatalities will inevitably occur if air is used in cases that show a severe rise of intracranial pressure—that is to say, in cases which show a high degree of papilloedema, stupor, or intense headaches and vomiting. There are, however, a number of other cases where the rise of pressure is but slight or moderate, in which ventriculography is clearly indicated, because no exact localisation of the tumour can be made by clinical means, and the danger of failing vision precludes any delay. The fact that in such cases as these the symptoms may be aggravated or altered by injection of air is a clear indication that there should be as little delay as possible between ventriculography and removal of the tumour. The experience of Case 2 shows that the disturbance occasioned by ventriculography may take effect very quickly after the injection of air. Elsewhere [5] I have reported a case of hydatid cyst of the right occipital lobe in which, during the four days that followed ventriculography, the patient sank insidiously into a state of coma, from which he was only rescued by the most urgent measures. The literature now contains a number of records of cases of intracranial tumour in which the patient died a few days after ventriculography, though the relationship of injection of air to the aggravation of the patient's symptoms is not often commented on in the case reports.

Withdrawal of the air after the skiagrams have been taken will mitigate to some extent the danger of ventriculography, but too much stress cannot be laid on the fact that ventriculography should be followed with all possible speed by removal of the tumour at operation. The use of ventriculography by anyone who is not prepared to proceed, at once if necessary, with the surgical removal of the tumour is fraught with grave risks, and can only bring discredit to a method which, when properly used, is a valuable adjunct to clinical investigation.

Conclusion.

Evidence has thus been brought forward to show that the signs of intracranial tumours may alter after ventriculography and osteoplastic craniotomy and decompression. If these surgical procedures have been carried out with no error of technique the changes that occur in the clinical picture are to be attributed to change in position or size of the tumour itself. By recognition of this principle it is sometimes possible to make a successful diagnosis of the situation of a tumour that has already been sought for at operation without success. It is therefore advisable that a negative intracranial exploration should always be followed by careful neurological examination.

Observations have been reported that indicate the manner in which ventriculography may endanger life, even in those cases where its use is not contra-indicated by the clinical condition of the patient. To prevent loss of life in these cases it is urged that ventriculography should be followed at the earliest possible moment by removal of the tumour.

I desire to thank Dr. Harvey Cushing for permission to report these cases. It is scarcely necessary for me to point out that, while I must shoulder the responsibility for any conclusions that have been reached, the central idea of this paper arose from observing him at work in Case 1.

References.

1. Elsberg, C. A.: Tumours of the Spinal Cord, London, 1925, p. 255.
2. Dandy, W. E.: A Method for the Localisation of Brain Tumours in Comatose Patients, Surg., Gynec., and Obst., 1923, xxxvi., 641.
3. Horrax, G., and Bailey, P.: Tumours of the Pineal Body, Arch. Neurol. and Psych., 1925, xiii., 423.
4. Critchley, M., and Ironside, R.: The Pituitary Adamantinomata, Brain, 1926, xlix., 437.
5. Cairns, H.: A Study of Intracranial Surgery, Medical Research Council, Special Report Series, No. 125, p. 43.

THE CHOLESTEROL METABOLISM DURING PREGNANCY.

BY J. ADDYMAN GARDNER, M.A.,
READER IN PHYSIOLOGICAL CHEMISTRY, UNIVERSITY OF LONDON;
AND
HUGH GAINSBOROUGH, M.D. CAMB., M.R.C.P. LOND.,
PHYSICIAN TO ST. GEORGE'S HOSPITAL.

AT the present time our knowledge of the normal metabolism of cholesterol is limited, but extensive changes in it have been shown to occur in patients with certain diseases and have attracted increasing attention to this subject. We know that there is a great increase in the percentage of plasma cholesterol (both free and ester forms) in subacute parenchymatous nephritis, associated with an increase of the cholesterol ester content of the kidney. Hypercholesterolæmia has also been reported in pregnancy, diabetes, cholelithiasis, arterio-sclerosis, &c. Indeed, in order to explain the fact that 75 per cent. of cases of cholelithiasis occur in women, it has been suggested that hypercholesterolæmia occurring in repeated pregnancies is of paramount importance in the formation of gall-stones. The suggestion, however, does not help to explain the occurrence of gall-stones in men; also we have found in an examination of post-mortem records of this hospital that cholelithiasis had not occurred in cases of subacute parenchymatous nephritis, where hypercholesterolæmia rules much higher than in pregnancy. Some clinicians have even gone so far, on such scant evidence, as to eliminate from the diet of cases of cholelithiasis all substances rich in sterols, such as eggs, milk, butter, and other fatty foods, and have also suggested that the diet should be restricted in this way during pregnancy.[1]

Reports on the occurrence of hypercholesterolæmia must, however, be reviewed critically. Most observers use a definite figure such as 0·16 per cent., or other figure of similar order, as representing the cholesterol content of the blood, and any figure over this they regard as constituting hypercholesterolæmia. We [2] have shown that the normal cholesterol content of the plasma varies between wide limits, but that in a given individual in a state of health the plasma cholesterol tends to remain at a fairly constant level

for long periods. Hence in order definitely to establish a true hypercholesterolæmia it is necessary either that the cholesterol content of the plasma should be raised above the normal maximum limits or that, in the case of an individual whose normal plasma cholesterol content is known, the value should be definitely higher than in health. Bearing these results in mind we have thought it important to investigate the changes in the plasma cholesterol during pregnancy, especially as a "free" form, at any rate in normal subjects, whereas the plasma contains both forms. We have, in earlier papers, repeatedly stressed the importance of determining both the free and ester cholesterol rather than the total, because the distribution of cholesterol throughout the body suggests that the two forms have not the same significance in metabolism. In many of the papers mentioned only total cholesterol values have been recorded. Tyler and Underhill have

The Figures in the Table represent Weight of Cholesterol per 100 g. of Plasma.

Case.	Date.	Gravid.	Duration of pregnancy in weeks.	Date of parturition.	Age.
1	Feb. 13 Apr. 16 May 14 June 11 Free 0·0505 0·1229 0·1700 0·0898 Ester 0·1029 0·0733 0·0367 0·0662 Total 0·1534 0·1962 0·2007 0·1560	1	40	July 24th	23
	July 9 July 30 Aug. 3 Free 0·1071 0·0486 0·0583 Ester 0·0669 0·1182 0·1187 Total 0·1740 0·1668 0·1769				
2	Mar. 19 Apr. 16 May 14 June 11 Free 0·0679 0·1181 0·0982 0·1456 Ester 0·1375 0·1065 0·0991 0·0640 Total 0·2054 0·2246 0·1973 0·2096	2	42	Aug. 15th	35
	July 9 July 30 Aug. 20 Aug. 24 Free 0·1097 0·1416 0·0596 0·0670 Ester 0·1040 0·1221 0·1023 0·0958 Total 0·2137 0·2637 0·1619 0·1628				
3	Mar. 19 Apr. 16 May 14 Free 0·0966 0·0826 0·1623 Ester 0·1880 0·1596 0·0982 Total 0·2846 0·2422 0·2605	2	42	June 26th	31
	June 4 July 2 July 13 Free 0·1082 0·0794 0·0905 Ester 0·1394 0·1120 0·1322 Total 0·2476 0·1914 0·2227				
4	Feb. 20 Apr. 16 May 14 Free 0·0772 0·2484 0·2317 Ester 0·1535 0·0881 0·0585 Total 0·2307 0·3365 0·2902	1	40	June 11th	22
	June 4 June 16 Free 0·1326 0·0925 Ester 0·1384 0·1713 Total 0·2710 0·2638				
5	Mar. 19 Apr. 16 July 2 July 23 Free 0·0677 0·2515 0·0834 0·0644 Ester 0·1161 0·0259 0·1696 0·1304 Total 0·1838 0·2774 0·2530 0·1948	1	40	July 15th	24
6	Feb. 20 Mar. 26 Apr. 16 Aug. 2 Free 0·1513 0·0785 0·0703 0·0941 Ester 0·0125 0·0664 0·0755 0·0773 Total 0·1638 0·1449 0·1458 0·1714	1	40	July 28th	19
7	Feb. 13 Mar. 26 Apr. 5 July 9 Free 0·1147 0·1187 0·2025 0·0749 Ester 0·2537 0·2784 0·1749 0·1158 Total 0·3684 0·3971 0·3774 0·1907	1	40	Mar. 30th	26
8	Mar. 27 Apr. 5 July 10 Free 0·0640 0·1054 0·0552 Ester 0·1295 0·1051 0·1005 Total 0·1935 0·2105 0·1557	1	40	Apr. 2nd	27
9	Apr. 18 May 25 June 16 Free 0·1671 0·1491 0·0789 Ester 0·0900 0·1101 0·1608 Total 0·2571 0·2592 0·2397	1	41	May 18th	31
10	Apr. 25 May 10 July 26 Free 0·2692 0·2400 0·0743 Ester 0·0059 0·0341 0·1420 Total 0·2751 0·2741 0·2163	3	40	May 6th	23
11	Feb. 20 May 14 Free 0·0693 0·1064 Ester 0·1448 0·1143 Total 0·2141 0·2207	2	38	May 24th	38

Remarks.—CASE 3. Albuminuria. No nitrogen retention. Hydramnios. Some post-partum sepsis and pyrexia. CASE 8. Albuminuria. Slight œdema of legs. Fit during labour. CASE 9. Albuminuria, a trace. CASE 10. Normal pregnancy. Had eclampsia two years previously.

Patient's initials.—Case 1, E. C.; 2, M. L.; 3, M. B.; 4, B. G.; 5, A. O.; 6, I. W.; 7, A. S.; 8, F. L.; 9, O. V.; 10, D. W.; 11, W. B.

critical examination of previous work shows some of it to be vitiated by recognised fallacies.

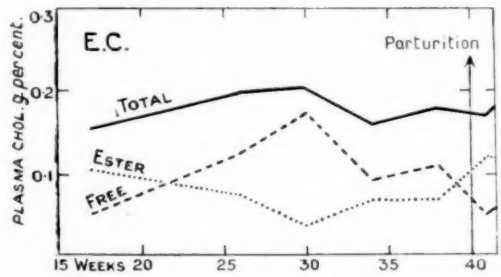
Blood analyses during pregnancy have been reported by Chauffard and his collaborators,[3] by Herrmann and Neumann,[4] Klinkert,[5] Schimpert and Huffmann,[6] Mauriac and Strymbau,[7] Denis,[8], Bloor,[9] Slemons and Stander,[10] Pribram,[11] Kuster,[12] and by Tyler and Underhill,[13] with the general conclusion that hypercholesterolæmia occurs in pregnancy and the early puerperium.

The Fallacy in Total Cholesterol Estimations.

The cholesterol throughout the body is present in two forms: as "free" cholesterol and also in combination with fatty acids, as esters. In the red blood cells practically all the cholesterol is present in the presented a large amount of analytical data giving both free and ester values during pregnancy, but the cholesterol determinations were made on whole blood. This method must tend to mask certain changes, since the cholesterol of red corpuscles is mainly, if not entirely, in the "free" state and is fairly constant in amount, whereas the cholesterol of the plasma is present in both free and ester forms, the latter usually in preponderating quantity. Hence an analysis of whole blood, including the almost constant sterol content of red cells, tends to diminish the value of quite large changes in the plasma cholesterol. Another factor which may vitiate conclusions, drawn from analyses of whole blood, as to changes of cholesterol metabolism in pregnancy, is the phenomenon of the anæmia of pregnancy, which varies markedly in

different individuals and is often of considerable degree. There is, however, a more serious objection to Tyler and Underhill's results, which they acknowledge in their paper. Their method consisted in choosing ten women from each lunar month of pregnancy, and, with rare exceptions, different women were taken each month. The results of the analyses of the blood specimens were then averaged. This average figure, however, is an average of series of figures in which the variations from the mean are very considerable, as will be seen from a study of their tables. Mathematically, an average figure obtained from such a few cases,

CASE 1.

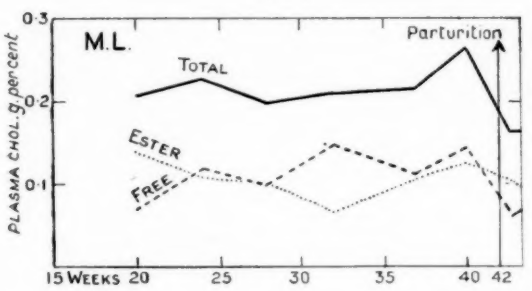


showing such wide variations, can have little value; just as in a study of the normal cholesterol content of plasma the significant values are the limits of variation and not the arithmetical average, which is less important. Finally, their results were obtained by colorimetric methods of analysis, which have been much criticised,[14 15 16 17] though in all probability the results of such methods are relatively correct.

The Present Investigation.

In our investigations we have examined a number of women attending the antenatal clinic at St. George's Hospital who were admitted to the lying-in ward for parturition. Owing to the hour of the clinic we were unable to take blood specimens in the "fasting" condition.[18] However, these women

CASE 2.

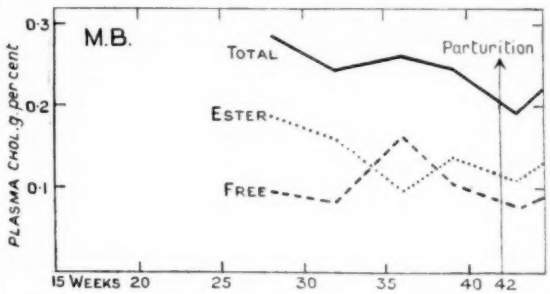


always attended at the same time of day, and, though it was practically impossible to control their previous feeding, this factor does not appear to have affected the results. Blood specimens were taken at monthly intervals before parturition and once or twice during the period of confinement. The analytical method used was that already described by us in detail [2] and, as 20 c.cm. of blood were required for each analysis, we were limited in our observations by the willingness of our subjects.

Our results are shown in the table; where a sufficient number of determinations were made the results are illustrated by graphs. The graphs are all characteristic, despite the fact that it was impossible, for obvious reasons, to obtain a sufficient number of blood samples to determine the exact shape of the curve. In the other cases in which still fewer observations were made, the results are in general agreement with the results from the more fully examined subjects.

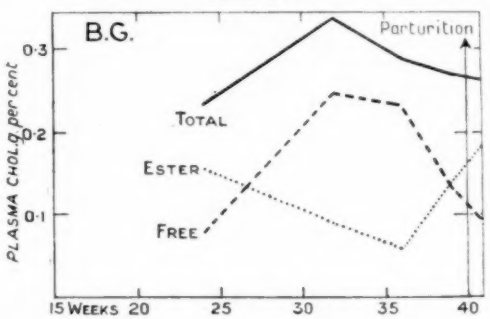
It will be seen that: (1) The free cholesterol of the plasma increases during pregnancy up to a maximum

CASE 3.



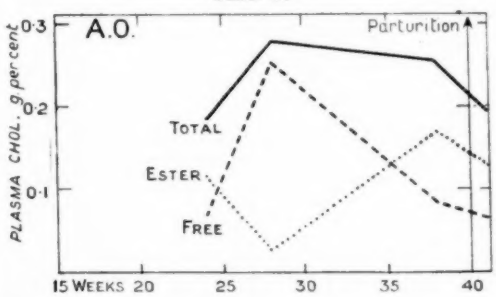
at about the thirtieth week; concurrently the ester cholesterol falls to a minimum at about the same time. (2) From the thirtieth week, more or less approximately, the amount of free cholesterol decreases and the ester cholesterol increases till an almost normal ratio of free to ester cholesterol is

CASE 4.



attained before or near parturition. (3) The plasma cholesterol values are generally normal in the first week or two of the puerperium. (4) Some cases show a definite total hypercholesterolæmia in which the total cholesterol figures run roughly parallel to the free cholesterol values. This is in general agreement with the results of the earlier observers, and our actual figures are of much the same order as theirs.

CASE 5.



During pregnancy there is a marked disturbance of the cholesterol metabolism which results in large changes in the ratio of free to ester cholesterol in the plasma, but to less definite changes in the total cholesterol.

We were tempted at first to correlate our results with changes that occur during the development of

the fœtus in the later months of pregnancy—for example, with the rapid growth of the brain and the accompanying marked tissue differentiation, since this organ is the richest of all organs in free cholesterol; or to suggest that the high free cholesterol in the mother's blood might serve the purpose of counteracting the effects of toxic bodies that might be formed in the process of pregnancy. As, however, we know nothing whatever of the function of cholesterol in the cell, and very little of the part it plays in general metabolism, it seems better, and less likely to lead to misapprehension at the present stage, not to indulge in hypothetical explanations, but simply to record the results of our experiments.

We take this opportunity to express our thanks to our colleagues, Dr. D. Roy, Dr. H. Taylor, and Dr. C. M. Gwillim, at St. George's Hospital, for their kindness in facilitating the supply of material and clinical details, and also to Miss A. Ratcliffe for valuable assistance in the laboratory.

References.

1. Hurst, A. F.: Practitioner, 1923, cxi., 321.
2. Gardner, J. A., and Gainsborough, H.: Biochem. Jour., 1927, xxi., 130.
3. Chauffard, A., Laroche, G., Gigaut, A.: Compt. rend. soc. biol., 1911, lxx., 536.
4. Herrmann, E., and Neumann, J.: Biochem. Zeit., 1912, xliii., 47: Wien. Klin. Woch., 1912, xxv., 1557.
5. Klinkert, D.: Berl. Klin. Woch., 1913, i., 820.
6. Schimpert and Huffmann: Ber. Freiburger Klin. Ges., 1912.
7. Mauriac, P., and Strymbau, M.: Compt. rend. soc. biol., 1914, lxxvi., 134.
8. Denis, W.: Jour. Biol. Chem., 1917, xxix., 93.
9. Bloor, W. R.: Ibid., 1921, xlix., 201.
10. Slemons, J. M., and Stander, J. S.: Bull. Johns Hopkins Hosp., 1923, xxxiv., 7.
11. Pribram, E. E.: Arch. f. Gynäk., 1923, cxx., 90.
12. Küster, H.: Klin. Woch., 1924, vii., 1216.
13. Tyler, M., and Underhill, F. P.: Jour. Biol. Chem., 1925, lxvi., 1.
14. Gardner, J. A., and Williams, M.: Biochem. Jour., 1921, xv., 363.
15. Gardner and Fox, F. W.: Ibid., 1924, xviii., 1058.
16. Fex, J.: Biochem. Zeit., 1920, civ., 82.
17. Mueller, H.: Jour. Biol. Chem., 1916, xxv., 549.
18. Gardner, J. A., and Gainsborough, H.: Biochem. Jour., 1928, xxii., 1048.

Clinical and Laboratory Notes.

A CASE OF PUERPERAL INFECTION DUE TO *B. AEROGENES CAPSULATUS*, SUCCESSFULLY TREATED BY THE USE OF WEINBERG ANTIGAS-GANGRENE SERUM.*

BY FRANCES IVENS, C.B.E., M.S. LOND., CH.M. LIVERP.,

HON. SURGEON, LIVERPOOL MATERNITY HOSPITAL; CLINICAL LECTURER IN OBSTETRICS AND GYNÆCOLOGY, UNIVERSITY OF LIVERPOOL.

I HAVE reported this case because, although this is fortunately a rare infection, it is usually a very fatal one, and I wish to point out the value of the early use of a powerful antitoxin, used in conjunction with the appropriate obstetrical treatment. In addition, I should like to emphasise the need for expert bacteriological reports in suspect cases. Animal experiment is almost obligatory in the absence of suitable anaerobic media. The guinea-pig is the more susceptible animal, but the rabbit is locally susceptible and can more usually be obtained.

A Case Related.

A woman, aged 28, was admitted as an emergency case to the Liverpool Maternity Hospital on June 18th, 1928.

History.—The patient was a healthy primigravida of 28. Her last period started on August 15th, 1927, and she expected on May 22nd, but labour did not begin until nearly a month later—viz., June 4th, 1928. The patient was under the care of a midwife and had had no medical antenatal examination. When pains started on June 14th, the midwife ruptured the membranes, and as there was no advance a doctor was called in, who advised waiting. Nothing further was done until four days later, June 18th, when the doctor was again sent for, and at midday attempted forceps delivery ineffectually. Numerous vaginal examinations had been made by the midwife. The patient was sent into hospital at 2.30 P.M.

On admission the temperature was 98° F., and the pulse-rate 128. The external measurements were good except for the outlet, which was 3 in. in the transverse diameter. The abdomen was very large, the presentation a vertex position right occipito anterior, but the head was above the brim and could not be pushed in. No fœtal heart was heard. On vaginal examination there was an offensive putrid discharge, the cervix was three-quarters dilated and lacerated. The urine showed a thick cloud of albumin.

Treatment.—Under general anæsthesia the vault was perforated by Miss R. Nicholson, and a large dead, peeling infant extracted, weighing 9 lb. 11 oz., without the brain. It measured 22 in., and showed large centres of ossification in the lower end of the femur and upper end of the tibia.

Delivery was difficult; it was necessary to divide a clavicle in order to bring down the shoulders as the child was so large. Bilateral tears in the cervix and a tear in the perinæum were repaired and an intra-uterine douche was given and 0·5 c.cm. pituitrin and 1·0 c.cm. ergotin were injected, followed later by 30 c.cm. of antistreptococcal serum. In addition, at my request, as there was such a gangrenous odour, on the following morning 20 c.cm. Weinberg antigangrene serum and 20 c.cm. anti-*coli* serum, also from the Pasteur Institute, were given subcutaneously with saline. From the profuse offensive lochia Prof. J. M. Beattie, by inoculation of a rabbit, isolated *Bacillus aerogenes capsulatus*, and the presence of *Bacillus coli* was also reported. After an early rise of temperature (temp. 99·8° F.) there was no pyrexia, but the pulse-rate remained high (130), and the cervix, vagina, and perinæum were œdematous and gangrenous. The patient had a yellowish toxic appearance, but no definite jaundice. Hypertonic saline packs in the vagina were employed, and she gradually improved and made an almost complete recovery at a convalescent hospital, though the uterus remained high and somewhat fixed.

The *Bacillus aerogenes capsulatus* (Fraenkel's gas bacillus), *B. perfringens*, or *B. welchii* is a large anaerobic Gram-positive organism which normally inhabits the adult intestinal tract. Although rare in the intestine of the breast-fed infant it is frequently found in those artificially fed, and more especially in infants suffering from gastro-enteritis. As a rule it is a saprophyte and does not invade deeper tissues until shortly before death. Weinberg and Nasta found it in the pus in 30 per cent. of cases of appendicitis, and recent researches have demonstrated the frequent presence of the organism in the subjects of pernicious anæmia.[1] Williams[2] also showed evidence of the immense proliferation of the Welch bacillus in the small intestine of patients with acute obstruction and peritonitis with stasis, and used *B. welchii* serum with good effect in a series of such cases at St. Thomas's Hospital. I have used *B. welchii* serum myself in similar isolated cases, and in Paris it is used extensively prophylactically in abdominal infections.

The Experience of Others.

B. welchii is especially fatal to women who have had criminal abortion induced, and numerous observations have been published in Australian literature. Beare and Cleland[3] recorded a fatal case of *B. welchii* infection originating in the uterus of a married woman aged 42 years, following an induced abortion. *B. welchii* was recovered after death from the uterus, liver, and heart blood.[3] Its presence in the blood is not always shown by clear clinical evidence. It may occasionally disappear after a few days without giving rise to a true septicæmia. In septic abortions Bingold made (1915–23) 120 positive blood cultures.[4]

When the bacillus has traversed the intestinal lining and is in the circulation it may localise and develop in the subcutaneous tissue at the site of a capillary hæmorrhage provoked by the injection of some medicament or subcutaneous saline. Weinberg and Francon (1919) have seen a case of gas-gangrene

* Read before the North of England Obstetrical and Gynæcological Society on Feb. 22nd, 1929.

of both thighs in a typhoid patient where spartein and adrenalin had been injected.

Toombs and Michelson[5] have collected and classified 41 cases of gas infection, including one reported by themselves, and consider that most cases follow abortion. The most marked symptoms are pain in the abdomen, rise of temperature, rapid pulse, jaundice, hæmaturia, and secondary anæmia, with expulsion of gas from vagina, physometra, or surgical emphysema. They consider hysterectomy, antitoxin, and blood transfusion to be the most logical methods of treatment. Recovery took place in 13·16 per cent. of these cases, and in the majority hysterectomy had been performed. The need for immediate operation was emphasised by the fact that 10 per cent. died within 24 hours and one-third in 48 hours.

Cases of gas-gangrene of the uterus are occasionally described under the name of physometra. In 1922 Brutt [6] described six cases of this condition following abortion, all treated by abdominal hysterectomy, with one recovery. Dobbin [7] reported a case of puerperal sepsis due to infection with *B. aerogenes capsulatus*.

A patient with a generally contracted pelvis had been in labour for several days under a midwife. On admission to hospital she was profoundly infected and the head of a macerated child was firmly engaged in the superior strait, and the uterus was in a state of tetanic contraction. A fœtid dark-coloured discharge was escaping from the vagina with a crackling sound. Delivery was effected by craniotomy, and death occurred the next day. Within a few hours the patient's body had nearly doubled in size as the result of gas development. The gas bacillus was found in the fœtus and placenta, as well as in the lochia.

Little,[8] in 1905, reported ten cases in the Johns Hopkins Hospital. In only one case did the bacillus occur in pure culture, but was often associated with the streptococcus. Welch [9] pointed out that the association of another organism seems to augment the virulence, and I can strongly corroborate that statement from my own experience of gas-gangrene in war wounds. He suggested that the gas bubbles found in the blood-vessels of women supposed to have died from air embolism are frequently the product of this bacillus. Gebhard,[10] in 1895, demonstrated the presence of *B. coli communis* in seven cases of tympanites uteri. It was shown by Henry [11] that the toxic power of *B. aerogenes capsulatus* is due partly to its hæmolytic action and partly to a substance which has a special affinity for muscle. When a woman after labour or abortion shows a yellowish tint and reddish urine it is probable that she is suffering from a severe *B. welchii* infection which is rapidly destroying the red blood cells. In these cases the hæmolytic nature of the jaundice is shown by the fact that the patients show no bilirubin in blood, cerebro-spinal fluid, or urine, nor yet traces of bile-salts. Recording two cases of gas infections of the uterus with jaundice due to *B. welchii* following abortion under the care of Magarey, Magarey, Cleland, and Sleeman [12] state that since the year 1920 a series of fatal cases has occurred in which jaundice was usually a prominent sign. The downward progress of the patients was usually rapid, death occurring two or three days from the onset of uterine bleeding. They consider the condition to be one of the commonest causes of loss of life following abortion in Adelaide Hospital patients. The patients all aborted at an early period of pregnancy from the second to the fifth month. Interference was suspected. It seemed that the most likely explanation of the gas-forming bacteria reaching the interior of the uterus was by the introduction of fæcal specks at the end of some implement used for bringing on abortion, as the vulval hair and orifice must frequently be contaminated with bacteria of fæcal origin. If these are once lodged in the uterus an excellent nidus is found for their development. They considered the most pronounced clinical feature in these infections to be the apparent lack of realisation by the patient herself of the severity of her illness. In contra-distinction to the anxious and worried faces of the ordinary general peritonitis patient, these patients are calm and unruffled. They seem to be mentally numbed, though quite clear and intelligent. This I know to be strikingly true in the classic form of gas-gangrene when, with the onset of septicæmia as the case progresses to a fatal conclusion, there is often a lemon-yellow coloration of the skin, an increase in the pulse-rate, sweating, coldness of the extremities, subnormal temperature, copious hæmorrhagic vomiting, and dyspnœa. The patient talks naturally, may eat well, and is generally conscious almost to the end.

Nürnberger [13] considers that local infection yields to curettage, but extension to the musculature requires immediate hysterectomy and serum therapy.

Rôle of Anaerobes.

The rôle of anaerobes in wound infection has been worked out very thoroughly by Weinberg at the Pasteur Institute. During the war he was able to isolate a new organism, the *Bacillus œdematiens*,[14] and to prepare a mixed powerful triple-antitoxic serum against *B. perfringens*, *Vibrion septique*, and *B. œdematiens*. His treatise,[15] gives an exhaustive survey of his work. The latest Pasteur antigangrene serum is a mixture of serums and contains in addition to the three previously mentioned organisms, one part of anti-*sporogenes*, to which organism is often due the fetid smell of gas-gangrene, and one of anti-*histolyticus*, which is believed to contribute to the intoxication of the body as a whole. To this serum has recently been added a powerful anti-coli serum.[16] To avert anaphylactic phenomena the serum is best given subcutaneously, at the time of operation, diluted with saline solution, and while the patient is under the influence of the anæsthetic.

References.

1. Kahn, M. C.: Proc. Soc. Amer. Biol. and Med., 1924.
2. Williams, B. W.: THE LANCET, 1927, i., 907.
3. Beare, F. H., and Cleland, J. B.: Med. Jour. of Australia, 1927, i., 719.
4. Bingold: Virchows Arch. f. Path. Anat., 1923, xiii., 246.
5. Toombs, P. W., and Michelson, I. D.: Amer. Jour. Obstet. and Gynec., 1928, xv., 379.
6. Brutt: Arch. f. Gynäk., 1922, cxvi.
7. Dobbin: Bull. Johns Hopkins Hosp., 1897, viii., 24.
8. Little: Ibid., 1905, xvi., 136.
9. Welch, W. A.: Boston Med. and Surg. Jour., 1900, cxliii., 73.
10. Gebhard, C.: Verh. d. Deut. Gesell. f. Gyn., 1893, p. 305.
11. Henry, H.: Jour. Path. and Bact., 1923, xxvi., 497.
12. Magarey, R., Cleland, J. B., and Sleeman, J. G.: Med. Jour. of Australia, 1927, i., 787.
13. Nürnberger, Ludwig: Münch. Med. Woch., 1925, lxxix., 1667.
14. Weinberg, M., and Séguin, P.: La Gangrène Gazeuse, Paris, 1918.
15. Weinberg, M., and Ginsbourg, B.: Données récentes sur les microbes anaerobies, &c., Paris, 1927.
16. Weinberg, M., and Prévot, A.: Extrait des comptes rendus des séances de la Societé de Biol., 1927, xcvii., 164.

AURICULAR FLUTTER AFTER DIPHTHERIA IN A CHILD.

BY PATRICK O'DONOVAN, M.D., M.R.C.P. LOND.,

RESIDENT MEDICAL OFFICER, NATIONAL HOSPITAL FOR DISEASES OF THE HEART.

A BOY, aged 5, was admitted to the National Hospital for Diseases of the Heart on Sept. 28th, 1928, under the care of Dr. John Parkinson.

History.—Five weeks before admission he seemed ill and complained of his throat. His mother saw some white spots on the side of the throat, but the doctor said it was not diphtheria, and a swab was not taken. He was, however, kept in bed for two weeks, but on getting up he was so pale and tired that his mother brought him to the out-patient clinic.

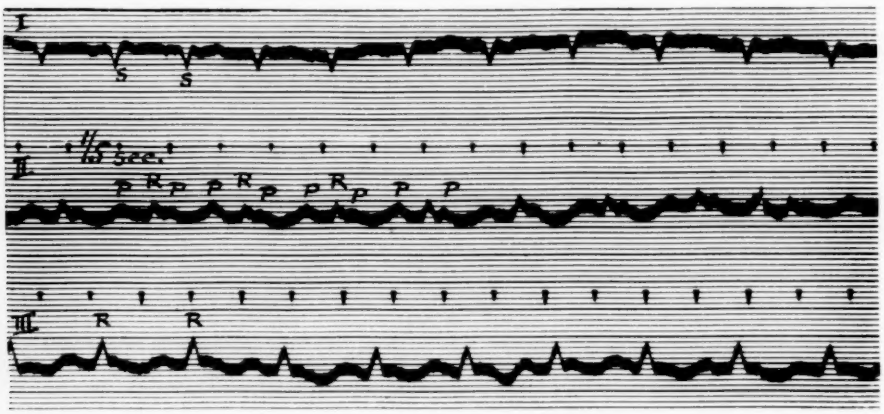
He was an only child, prematurely born (seven months), but of healthy parents. He always seemed frail and had scarlet fever, measles, and bronchitis, all within the previous year. There was no history of rheumatic fever or chorea.

Condition on Admission.—He was thin and strikingly pale. Weight, 33 lb.; height, 42 inches. The face seemed a little puffy, and this with a cloud of albumin in the urine gave a superficial resemblance to acute nephritis, but the

albuminuria cleared within a fortnight. There was no obvious dyspnœa, and no cyanosis, pulsation in the neck, or clubbing of the fingers. The heart rate was about 160 a minute on auscultation and irregular in rhythm—e.g., 30 regular beats, then a few irregular beats, then again 30 regular beats, and so on. The blood pressure was 105 mm. Hg systolic and 70 mm. diastolic. The apex-beat was in the fourth left interspace, just within the nipple line. No thrill was felt. On auscultation there was well-marked triple rhythm, apparently a duplicated first sound followed by the second sound. No murmurs were heard. The liver could be felt enlarged for about two inches below the right costal margin. The spleen was just palapble. There was no œdema and no ascites.

An orthodiagram showed enlargement of the heart (Fig. 4). An electrocardiogram taken on the day of admission showed auricular flutter with an auricular rate of 330 per minute and 2 : 1 block. In addition there was some left ventricular preponderance (Fig. 1).

FIG. 1.



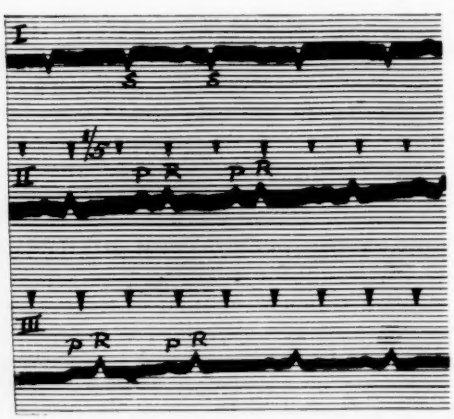
Electrocardiogram taken on admission, showing auricular flutter: A. 330, V. 165.

Course of Illness.—During the next few days in hospital the ward-sister noticed that he had a nasal voice. Examination of the nervous system then showed paralysis of both external recti muscles, so that lateral fixation produced squinting. The palate was paralysed, remaining immobile on phonation. The patellar and ankle tendon reflexes could not be elicited. The arm and abdominal reflexes were easily obtained and there was a double flexor plantar response. No sensory change was found. Nasal and tonsillar swabs proved negative for Klebs-Löffler bacilli. At the same time a Schick test gave a faintly positive reaction within 24 hours. The Wassermann reaction of the blood was negative. Some movement in the palate with complete recovery from the ocular palsy and return of the leg reflexes were noted in the sixth week in hospital—i.e., some 11 weeks after the so-called tonsillitis. The diagnosis of post-diphtheritic paralysis was thus confirmed.

On the third day in hospital, though the ventricular rate was still 160, an electrocardiogram showed normal rhythm (Fig. 2). During his subsequent stay in hospital repeated electrocardiograms never showed a return of auricular flutter. At the end of the first week his apex rate was 150, and triple rhythm persisted; the liver was smaller and the spleen no longer palpable. In the third week the rate had fallen to 120 and the liver was no longer palpable. Subsequently the heart rate fell to from 110–100, and remained at this level (Fig. 3). In the eighth week a modification of the first sound at the base merely suggested duplication. Twelve weeks after the disappearance of flutter he was up and about the ward, free from signs and apparently well. An orthodiagram now showed a heart of normal size (Fig. 4).

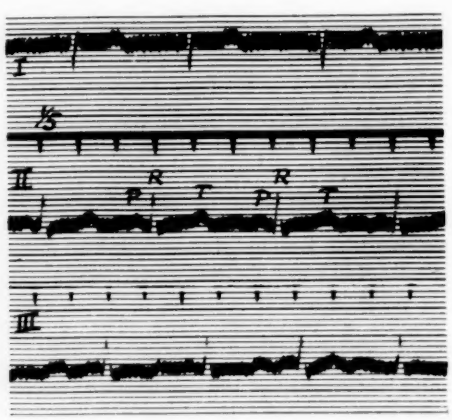
Dr. D. Evan Bedford has kindly furnished the following measurements from the original orthodiagrams. Fig. 4 (A): Oct. 8th, 1928, total transverse diameter (T.D.), 10·1 cm., area of frontal silhouette (area) 72 sq. cm., and cardiothoracic ratio 57 per cent. Fig. 4 (B): Jan. 4th, 1929, T.D., 7·9 cm., area 52 sq. cm., cardiothoracic ratio 47 per cent.

FIG. 2.



Electrocardiogram taken three days after admission, showing normal rhythm with simple tachycardia at a rate of 160 a minute.

FIG. 3.



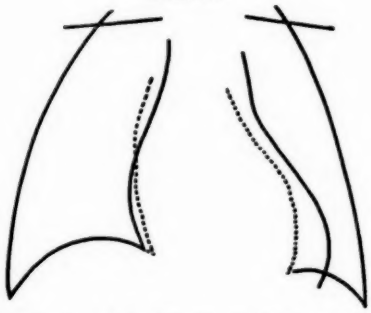
Electrocardiogram taken eight weeks after admission, showing normal rhythm at a lower rate (100).

Treatment.—The return to normal rhythm took place without the use of any drugs whatsoever, but he was kept strictly in bed for ten weeks.

Flutter in childhood, even apart from diphtheria, is rare. In the records at the National Hospital for Diseases of the Heart no case can be found in a child so young as here described. In the series of 50 cases of flutter published by Parkinson and Bedford [1] the youngest was aged 12. Poynton and Wyllie [2] have recently recorded a case of paroxysmal flutter in a

child observed from the age of 4 months to 3½ years, and whose electrocardiogram in an attack shows 1 : 1 flutter. Interesting and proved cases are also recorded by Lewis [3] and by Amberg and Willius,[4] the latter in a child with congenital heart disease. Speaking of the cardiac complications of diphtheria, Smith [5] says "of 242 patients (under his own care) the vast majority presented a rapid heart rate . . .

FIG. 4.



Orthodiagrams: (A) Continuous outline = on admission. (B) Interrupted line = 12 weeks after admission, showing smaller cardiac outline with recovery.

the initial tachycardia varied from 135–172." As other sequelæ he reports with electrocardiographic records, sinus arrhythmia, premature contractions, and heart-block. In his series there occurred neither paroxysmal tachycardia nor auricular flutter. Hume,[6] Bie and Schwensen,[7] and Schwensen,[8] report probable but not proved cases of flutter occurring after diphtheria. Smith [9] has published a unique case with a record taken at the moment of death in a child aged 4 with diphtheria, showing successively tachycardia, ventricular flutter, fibrillation, and heart-block.

Even paroxysmal tachycardia as a sequel of diphtheria is a rarity. Hume [6] reports a case with polygrams, and Marvin and Buckley [10] a case of ventricular paroxysmal tachycardia. Apart again from diphtheria interesting cases of unknown ætiology have been published by Koplik [11] and Hutchison and Parkinson [12] in children of an age ranging from 10 months to 10 years.

To summarise, a child of 5 years was seen five weeks after diphtheria with signs of heart failure. The electrocardiogram showed auricular flutter, which disappeared spontaneously within three days of admission. With the return of normal rhythm the same ventricular rate persisted for several days, and then fell quite gradually. Orthodiagrams showed a reduction in the size of the heart with recovery. No similar case of auricular flutter, confirmed by electrocardiogram, following diphtheria seems to have appeared in the literature.

My thanks are due to Dr. John Parkinson for permission to describe this case.

References.

1. Parkinson, J., and Bedford, D. E.: Quart. Jour. Med., 1927, xxi., 21.
2. Poynton, F. J., and Wyllie, W. G.: THE LANCET, 1926, ii., 371.
3. Lewis, T.: Lectures on the Heart, New York, 1915, p. 117.
4. Amberg, S., and Willius, F. A.: Amer. Jour. Dis. Child., 1926, xxxii., 99.
5. Smith, S. C.: Jour. Amer. Med. Assoc., 1921, lxxvii., 765.
6. Hume, W. E.: Heart, 1913–14, v., 25.
7. Bie, V., and Schwensen, C.: Jour. Infect. Dis., 1922, xxx., 308.
8. Schwensen, C.: Ibid., 1922, xxx., 279.
9. Smith, S. C.: New York Med. Jour., 1922, cxv., 78.
10. Marvin, H. M., and Buckley, D. C.: Heart, 1924, xi., 309.
11. Koplik, H.: Amer. Jour. Med. Sci., 1917, cliv., 834.
12. Hutchison, R., and Parkinson, J.: Proc. Roy. Soc. Med. (Sect. Dis. Child.), 1914, vii., 117.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF OBSTETRICS.

THIS Section held a joint meeting with the Maternity and Child Welfare Group of the Society of Medical Officers of Health on March 15th. The chair was taken by Dr. J. S. FAIRBAIRN, President of the Section, and Prof. J. MUNRO KERR opened a discussion on the

FUTURE OF THE MATERNITY SERVICES.

He pointed out that great advances had been made during the last decade in maternal and infant welfare. Antenatal supervision had definitely lessened the incidence and severity of obscure metabolic disturbances, and abnormalities in labour could be foreseen and thereby lessened in gravity. A large number of women became casualties because of faulty tactics in obstetrics, chiefly because of the difficulty of carrying out satisfactory tactics in domestic practice. Until quite recently the undergraduate had not received adequate practical instruction in midwifery, yet even the adequately trained undergraduate could not be regarded as a finished craftsman in obstetrics any more than in surgery. Nevertheless, the day after he was qualified he might be called upon to deal with a placenta prævia, though the public would never agree to his performing a major surgical operation. The trouble had arisen from the idea that parturition was an uncomplicated process, but often it was not, and in the simplest parturition there was a risk of sepsis. One grave abnormality alone—persistent occipito-posterior presentation—occurred in 20 per cent. of cases. The large body of practitioners did not want to engage in obstetric practice. Many had to undertake it because others did; they recognised it as a necessary evil which disorganised a crowded day's work. It was impossible for general practitioners in the middle of an influenza epidemic to give their obstetric cases proper attention. Their attitude was quite rational. All Prof. Kerr asked of the general practitioner was that he should allow those of his colleagues who were interested in obstetrics to modify domestic practice in such a way as to relieve him of the burden. The time was long past when the general practitioner could be a jack-of-all-trades. The future of domestic practice must lie in the direction of pure medicine, and the practitioner would only be enhanced in the eyes of the public thereby. The present high maternal and fœtal mortality and morbidity showed that domestic midwifery could not be satisfactory, and the reasons were: (1) the difficulty in securing surgical cleanliness; (2) the fact that midwives and nurses were expected to perform a number of domestic duties as well as attending to the patient; (3) the difficulty in securing adequate assistance if an operation became necessary; (4) the disturbance to the routine work of a busy practitioner, so that he was tempted to expedite delivery unnecessarily or prematurely; (5) the inadequate experience of practitioners in the craft of obstetrics now that 60–70 per cent. of the work had passed into the hands of midwives.

The Proposed Remedy.

Prof. Kerr suggested two forms of obstetric service, one mainly institutional and the other largely domestic. There should be, he thought, enough beds for all primiparæ, for all multiparæ whose labour was likely to be complicated, and for antenatal cases. The remaining normal multiparæ might be attended at home by midwives. A large number of patients might be transported to hospital by ambulance as soon as labour started and sent home again in the same way after three or four days. The fate of the parturient was sealed in the labour ward, and if all was well three or four days afterwards she could safely

go home. This was not suggested as ideal, but as an expedient to get over the difficulty of inadequate hospital accommodation. Obstetric beds should be concentrated in most carefully selected centres, which should be as few as possible, and should be in the hands of obstetric specialists. The alternative scheme would be to have a domestic obstetric service supplied by specialists, but it was very doubtful whether this would be as satisfactory. For a town like Glasgow and its environs about eight or ten obstetric specialists would be required. They would supervise the work of the midwives, which would serve to keep their work up to the standard inculcated during their training. Any scheme demanded the support of all branches of the profession and financial aid from the Government and local authorities. If, however, the doctors concerned did their part without bitterness the necessary money would be forthcoming. The public should realise that there would always be an irreducible minimum of casualties; puerperal infection could never be absolutely stamped out and there would always be minor accidents.

The General Practitioner's Part in the Scheme.

Dr. J. J. BUCHAN said that in his opinion the general practitioner was a very potent factor in public health—the outlying scout who saw early defects in health—and he would be very sorry to see him divorced from the same kind of work in midwifery. Child-bearing was a strictly physiological function and the danger involved should be very small. That it was not so was due to three things: (1) the number of women who were unfit for the ordeal of maternity because of defects in their health or development; (2) the want of knowledge or the failure to seek advice and help, especially early in pregnancy; (3) the want of facilities for advice and treatment. These were in order of importance; the first was by far the largest factor, and in the future an increasing amount of care and attention would be paid to the hygiene and development of girls. The cause of difficult maternity was in many cases to be found early in the life of the individual, and ought to be mitigated before any question of maternity arose. A certificate of fitness for marriage seemed to be involved, and it was certainly an important question how far the public might interfere to prevent the birth of diseased offspring. It was most important that the public, especially women, should know about the maternity service, and information should not be confined to the pregnant alone. Our insurance system had failed to appreciate the experience of Germany that benefits in kind were more helpful than benefits in cash. It would be of the greatest value if part at least of the maternity benefit could take the form of maternity service. The requirements of each locality must be considered separately. In industrial districts the midwife was perhaps the most important unit in the maternity service. She was a health officer; her duties were to observe and supervise normal conditions, and her duties to abnormal conditions ceased when she had recognised them and called in a medical attendant. Thereafter her duties as a nurse might begin in carrying out the doctor's instructions. She ought not to be at liberty to prescribe any drug or carry out any procedure for the correction of abnormality. Even the doctor should regard his duty as primarily hygienic, and only interfere if interference were unavoidable. Owing to the increased use of the midwife the doctor was apt only to be called in to abnormal cases, and to come to regard all midwifery as abnormal. Progress would be through development of the work of the midwife and the ordinary practitioner, not that of the specialist. In all public health activities it was the little common things that mattered, and these the midwife and general practitioner observed. Every pregnant woman, however, should be brought into touch, as early in pregnancy as possible, with the obstetric specialist—through the antenatal clinic, for instance—and the specialist must be a real part of the service, linking up all the others. Finally, without adequate hospital accommodation no service could be regarded as effective.

Mr. EARDLEY HOLLAND said that although institutional midwifery would be the midwifery of the future, we must in the meantime depend on the general practitioner and midwife. The standard of a maternity service depended essentially on a midwifery tradition, and in this country a great midwifery tradition did not exist. It must be inculcated in the medical public, whence it would spread to the general public. It could only be created by the proper training of medical students and midwives. Mr. Eardley Holland then reviewed the advances made since the war by the obstetric specialists and the public health authorities respectively towards a better midwifery service. Unfortunately the maternal mortality-rate, the essential test of the service, remained high, proving that the problem had been tackled in the wrong way. The money and man power that had been spent would have given a far better return if it had been used to further the reforms suggested by the committee of the Obstetrical Section of the Royal Society of Medicine. Before a service could become effective it must have a personnel, and the salvation of British midwifery depended on the establishment of large hospitals and training centres with a high standard of excellence, and staffed by obstetric specialists. These should have outposts staffed by junior specialists, and should serve a wide area by means of a good ambulance and telephone service. Every maternity hospital was dangerous unless it had three divisions: one for clean booked cases, a smaller one for emergency cases, any one of which was potentially a puerperal infection, and a still smaller division for frankly septic cases arising in hospital. A great deal of the puerperal infection arising in small maternity hospitals was due to mixing emergency cases with clean ones. The time would come when very few general practitioners would do midwifery. If these large centres were established they would provide a large number of young men highly trained in midwifery, and the public would learn to seek these practitioners for confinements. Any person who had charge of patients during pregnancy ought to be responsible for them during labour. The country had gone mad on antenatal work, and much of it was utterly irresponsible.

The Midwife and the "Handy-woman."

Dr. EUSTACE HILL did not agree that most general practitioners had no desire to practise midwifery. Many obstetric specialists were apt to take too narrow a view of the midwifery service problem and to forget the country district where, even with cars, it would be quite impossible to get a consultant to the patient until the need for his services had passed. Antenatal clinics were in their infancy and imperfect, but a proper antenatal service must be of great advantage to the community, and must provide the most expert obstetric opinion. He advised the following measures: (1) Improvement of the status of the midwife; the standard of education, the salary, the transport, and the holidays were all inadequate. The midwife should be a trained nurse with 12 months' special obstetric experience or else the period of training must be prolonged, perhaps by some system of post-certificate work under supervision. (2) Development of antenatal centres on the right lines. (3) Adequate bed provision in maternity hospitals or homes. (4) Adequate specific provision for sepsis. (5) Elimination of the untrained midwife or handy-woman. (6) Improved education of the medical student. (7) Alteration in the powers of the Central Midwives Board. The handy-woman was tacitly acknowledged by many doctors. It should be a sine qua non of maternity benefit that the woman should engage either a doctor or a qualified midwife, one of whom must undertake the confinement. It had been shown that a good maternity service of midwives could secure a maternal mortality-rate one-fifth that of the sparsely populated district where midwives were not available.

Discussion.

The PRESIDENT said that the great objection to domiciliary midwifery was the pressure brought to bear on the doctor by patient and relatives to end labour. The country was rapidly being urbanised, and it was therefore best to make a scheme first for the more populated areas.

Lady BARRETT suggested that certain measures might be taken at the moment to enable the general practitioner to do his work with greater facility and satisfaction. Every patient should employ a qualified midwife, even though she had a doctor as well, because it was quite impossible for the busy practitioner to give the time that the best midwifery required for letting things go on quietly under careful observation. The provision of a midwife for every case would soon do away with hurried midwifery and bring about coöperation. It might be possible for the midwife to give an anæsthetic in the later stages when the doctor was present. At the outside, the medical student had three months' training in midwifery, yet the young doctor was expected to go to the aid of a midwife who had spent 12 months training in midwifery. It was possible that we still had altogether too low a standard for the obstetric education of the doctor. The consultant service should also be extended to cover all difficulties in labour so that no doctor, however poor his patient, need hesitate to call in expert advice. All puerperal fever should be treated by obstetric specialists, and not in fever hospitals.

Dame LOUISE MCILROY brought forward the patient's point of view, and suggested that few women would care to be taken back to all the problems of their homes four days after their labour. She agreed that the future of the midwifery service lay very largely in the hands of the general practitioner, and that coöperation between doctor and midwife was very valuable. She was convinced that many deaths were due to the shock of the very painful process of labour without any sedative: were midwives, therefore, to be allowed to give sedatives and anæsthetics? She did not see how it was possible to have too much antenatal work. Where possible there should be a panel of general practitioners showing special interest or aptitude for midwifery to run antenatal clinics and follow up their cases. The Registrar-General's puerperal mortality figures ought to be analysed; they included, for instance, cases of pneumonia during the parturient period, although the woman's pelvic organs might have been perfectly normal. Antenatal cases ought not to be in the same ward with puerperal ones. A case of *Bacillus coli* infection would cause puerperal temperatures in that ward for several weeks afterwards. The obstetrician ought to treat all his own cases of sepsis; to teach students what sepsis was would teach them its prevention. Obstetric specialists were sometimes very unfair in their criticism of the general practitioner; they had done little to improve his position. Too often midwifery was taught by house surgeons or junior officers, while the chief only attended for occasional major operations.

Mr. W. S. A. GRIFFITH said that after 55 years' experience of midwifery he still held that the essential crux of the problem was the education of the doctor and midwife, and there was a crying need for its improvement. The cure for the "handy-woman" had been provided by the General Medical Council's notice about covering. At present only a small proportion of the trained midwives practised midwifery, because the prospects of reasonable pay and comfort were very small.

Dr. W. H. OXLEY said there was an enormous need for improvement in the training of students in practical midwifery, and it was marvellous how men learned in private practice to deal with the obstetric difficulties they encountered. The real obstetric specialists of the country were the general practitioners. It was a general practitioner who had taught in the middle of last century that diagnosis should be made abdominally and that vaginal examinations were undesirable. It was a general practitioner—the late Dr. Cursham Corner—who had inaugurated antenatal work on a large scale 15 years before Ballantyne. It was a general practitioner who had first drawn attention to the grave dangers of puerperal fever carried by droplet infection. Nothing whatever had been done by the obstetric specialists until the report of the Ministry of Health had alarmed the country. The amount of good work private practitioners did under vile conditions, and with no training, was surprising. He agreed with Dr. Hill's recommendations, but thought the only practical solution was an insurance maternity service, requiring a midwife for every case, a doctor for every emergency, subsidised hospital beds, and consultants for difficult cases. It would be wrong to provide a lot of hospital beds for normal cases. A halfpenny per week per insured person would supply all the funds necessary.

Dr. STELLA CHURCHILL said she would be sorry to see an extension of the National Health Insurance Act, as it would give more scope to the general practitioner without improving his training or results.

Sir EWEN MACLEAN said there was a tendency for people who did not know the difficulties of the obstetricians to bring railing accusations against them. Many midwives rendered excellent service, and anything that improved their training was all to the good, but in practice it was not always easy. In country districts the regulations of the Central Midwives Board were often disregarded, and there were still many handy-women prepared to attend a lying-in or a laying-out with equal zest. The ideal scheme was to have midwifery beds in direct association with the antenatal clinics of the local authority. The first and only practicable contribution to a maternity service was going to come from the further development of the insurance system. The general practitioner was the first line of defence, and his interests must be safeguarded if any scheme was to come to fruition.

The PRESIDENT recommended to those who depreciated the activities of obstetricians a perusal of the Transactions of the Obstetrical Society and of the Proceedings of that Section. Nearly all the recent enactments had been foreshadowed there.

Prof. MONRO KERR, in reply, remarked that the two greatest contributions ever made to the progress of practical medicine had been made by obstetricians—Semmelweiss and Simpson.

Dr. HILL, in reply, said that the difficulties of getting evidence against the handy-woman had proved insuperable in nine cases out of ten. No local pressure would eliminate her. The only way of arranging antenatal work in rural districts was for the general practitioner to do it; he was well able to undertake it, for the best men in the profession were the practitioners in scattered rural areas.

LIVERPOOL MEDICAL INSTITUTION.

AT a pathological meeting of this institution on Feb. 17th Dr. M. DATNOW read a paper on the

Effects of Lead on the Tissues.

After a brief historical review of lead poisoning he gave an account of experimental work carried out for the Liverpool Medical Research Organisation. The animal used was the rabbit, and the chief lead preparations used were the phosphate, aspartate, glutamate, hippurate, malate, iodobenzoate, and the benzoyl aspartate, in colloidal suspension containing 0·5 per cent. of lead. The lead colloid was introduced by intravenous injection. Dr. Datnow said that as the liver—with the possible exception of the spleen—was the main organ concerned in taking up lead from the blood stream, it was also the organ which first showed pathological changes. With massive doses or with very toxic preparations—e.g., 10 c.cm. of lead malate or 5 c.cm. of the more toxic benzoyl aspartate—extensive hæmorrhage was found throughout the liver substance. With therapeutic doses there was only transient cloudy swelling which

cleared up in 24 hours. This was confirmed by liver function tests and by clinical observations. Intermediate doses produced extreme dilatation of the capillaries with compression of the liver cells; the zone of the central vein was first affected. Similar changes were observed in the kidney. In the heart muscle apart from hæmorrhages with lethal doses no definite pathological changes were found. The spleen showed increased pigment with dilatation and congestion of the sinuses. Dr. Datnow also briefly mentioned the selective choriotropic effect of lead first pointed out by Blair Bell. He concluded by describing the effects of lead on rat tumours (Flexner rat carcinoma and sarcoma), demonstrating the destruction of the malignant cells with increased fibrosis in the tumours after treatment with lead aspartate.

HARVEIAN SOCIETY.

AT a meeting of this Society on March 14th, held at the Paddington Town Hall, Dr. GRAHAM LITTLE, M.P. for the University of London, delivered the Harveian Lecture on

THE MEDICAL PROFESSION, THE VOLUNTARY HOSPITALS, AND THE DE-RATING BILL.

He said: This Bill, officially known as the Local Government Bill, is likely to bring the most drastic changes in our hospitals, in all the health services of the country, and in the actual exercise of the profession by the individual members of it. The Bill has two main purposes. First, the introduction of changes in the local government of this country, rendered necessary by the redistribution of the population and other causes in the century which has elapsed since the present system of poor-law administration was inaugurated—that is, 1834. The second purpose, the relief of rates, in a number of industries which are called "productive industries." The first purpose is obviously the more important, inasmuch as the Ministry of Health has been entrusted with the whole Bill, and it is this part of it that will be considered.

The Bill transfers the poor-law administration from the boards of guardians to the county councils and county boroughs, but the provisions of the Poor Law Act of 1927 are retained. It is a change of administration rather than a change of principle. The importance of the change to the medical profession lies chiefly in the power and even the encouragement given to the new county councils and county boroughs to provide hospitals and maternity homes, and the consequent probability of competition resulting between these new municipal hospitals and the voluntary hospitals already in existence has given rise to much uneasiness, very obvious in the debate in the House of Lords just concluded. Amendments proposed both in the House of Commons and in the House of Lords to provide some machinery for securing coöperation of the new municipal hospitals with the old voluntary hospitals, and so avoiding competition and overlapping, have been refused on the part of the Government, and it is true to say that at present there is no real check provided by the Bill to prevent that competition. The retention by the Minister of the complete control of all medical (and other) officers under this scheme makes a still wider extension of the medical autocracy of the Minister, already conferred by the National Health Insurance Act. About half of the entire medical profession in this country operates that Act at the present time. The medical staffs of the new municipal hospitals will also be under the control of the Ministry of Health. The Minister makes no secret of the desire of the Ministry, not as yet achieved, to extend the health services so as to include not merely the destitute but the sick, and thus foreshadows a nationalisation of the whole of the medical services in this country. A further extension of the power of the Ministry follows upon the changes in the relationship between the Exchequer and local bodies. The substitution of block grants for the percentage grants hitherto made to local bodies further increases the power of the Minister, for he reserves complete control of these grants, he may vary or modify them as he will.

The necessity, Dr. Graham Little continues, for providing further institutional treatment than the voluntary hospitals are able to supply in their present condition of development is conceded, but the means adopted for supplying this treatment may be questioned. The voluntary hospitals have been unable to meet the demands upon them because they have become so popular, and their funds have not allowed them to meet the demand as quickly as the public desire. The prestige of the voluntary hospitals explains why patients are willing to wait for admission to those institutions rather than to seek admission at the poor-law hospitals already in existence. There is no guarantee that patients will not still prefer to wait for admission at the voluntary hospitals. Government Departments cannot create prestige or personnel. A more logical and certainly a far more economical solution of adjusting the difficulty of empty beds at the poor-law hospitals and over-full beds at the voluntary hospitals would seem to be the provision of beds at those institutions where the demand is greatest. That provision could be made at a far smaller cost than would be entailed by starting new hospitals, and all the voluntary hospitals are, in point of fact, extending their accommodation as fast as funds will allow them to do so. Laboratories and special departments, which constitute so large an expense of hospitals, are already there, at the voluntary hospitals, and the consequent extra expenditure would be little more than the actual costs of providing new beds with a slight addition for the increase of the medical staff. The Ministry of Health, however, has determined upon the much more expensive and perhaps more dubious expedient of encouraging the establishment of quite new hospitals, and no provision whatever has been made to prevent competition with existing hospitals in each area.

During the last decade the voluntary hospitals throughout London and the country have become largely self-supporting institutions, and the voluntary system has developed into a great coöperative system of insurance, voluntary in character but growing rapidly to include quite new sections of the population. There is now an additional effort in progress to include certain sections of the middle classes. In these circumstances it is quite possible that the voluntary hospitals may elect to remain independent and to continue as they are now, outside the orbit of operation of the Ministry of Health, at any rate as regards their management. They would probably continue to attract, as they have in the past, the services, both lay and medical, of the best men and women of their time. Under modern conditions of medical practice the training of specialists who form the staffs of voluntary hospitals for the most part entails so many years of preparation that the supply is strictly limited. It would be quite impossible to staff the new municipal hospitals with officers of the same status as those who staff the voluntary hospitals without drawing upon the personnel of the voluntary hospitals. It is the freedom and elasticity of the voluntary system which has attracted such a high quality of service, both lay and medical. The importance of preserving this service seems paramount, but cannot be achieved without preserving freedom, especially freedom from departmental control. It would be entirely possible to blend the proposed new institutions with the old if a measure of freedom were retained. A central advisory body could be constituted to guide and coördinate health services throughout the country, this advisory body to be comprised of representatives of the County Councils, of the Ministry of Health, and the voluntary hospitals. In London the body representing the hospitals

might well be King Edward's Hospital Fund; in the provinces the body representing the hospitals is less obvious, but might be drawn from the Voluntary Hospitals Commission, or as Sir Arthur Stanley proposes in a recent letter to the *Times*, the Regional Committees of the British Hospitals Association. It is submitted that to keep the voluntary system intact in both lay and professional fields the representation of the voluntary hospitals must be predominant in this advisory council. The nearer the new hospitals approach to the atmosphere and practice of the voluntary hospitals the more probable is their ultimate success, in securing the confidence of patients, in maintaining economy and efficiency, and in winning the wholehearted and enthusiastic coöperation of the medical profession, upon which the success of any health scheme must ultimately rest.

Reviews and Notices of Books.

The Chemistry of Chemotherapy.

By G. Malcolm Dyson, Ph.D., Research Biochemist to the Laboratory of Applied Pathology and Preventive Medicine, Manchester. London: Ernest Benn, Ltd. 1928. Pp. 272. 32*s.* 6*d.*

This volume appears to be largely a summary of the well-known works on the subject, such as Fraenkel's "Die Arzneimittelsynthese." The writer sets about his task of writing the book in a somewhat patronising spirit. For instance, in the preface he says, "Details of symptoms have been omitted as far as is possible, and no references have been made to chemical details of synthesis and production, since this book is intended for the 'plain chemist' (if there be any such left!) rather than for the expert pharmacologist or for the 'compound maker.'" Quite early in the book Mr. Dyson expresses his opinion of the medical type of investigator; he says: "A third difficulty which could, possibly, be more easily removed, is the looseness of thought and even of experimental technique found widely among investigators in physiological, pathological, and pharmacological laboratories, leading often to generalisations based on insufficient evidence, often upon no real evidence at all. This has caused several especial difficulties which are met with in a critical survey of work done upon the subject of the action of drugs." This somewhat disdainful condemnation of his fellow-workers is not justified.

The first chapter of the book is entitled Physiological Action and the Nature of Matter. Here Mr. Dyson shows some lack of familiarity with physiological and pathological nomenclature. He was unfortunate, for example, in his choice of the term enzyme in the first paragraph, when he refers to the two classes of protective substances—first, the externally synthesised substances produced by the chemotherapeutist in the laboratory, "in contradistinction to the various substances *of the enzyme class* (our italics) which the animal is able to synthesise within itself as a defence organisation against bacterial invasion." On page 17 we get another reference to enzymes, where the author says: "The whole trend of the study of enzymes and their activities leads to the conclusion that their specificity—the 'lock and key' action of Fischer—rests finally upon the electronic nature of the molecular constitution, and that whilst their structural formulæ (in the conventional chemical sense) may reveal nothing concerning the reasons for their specific action, the energy relations of the ultimate particles which make up their molecules are the agents responsible for the development of specific activity." So much for the speculative and reflective part of the book. The sections on chemotherapeutics are clearly arranged, the substances being grouped according to their chemical constitution. Thus the compounds of carbon, oxygen, and hydrogen are dealt with in the second chapter; the third being devoted to the halogen derivatives. Chapters IV. to VIII. are wholly given up to the study of the simple and more complex compounds of nitrogen. The compounds of sulphur, selenium, and tellurium, and the organometallic compounds are respectively the subjects of the last two chapters. In each case the structural formula is given, together with a few details of the chemical properties of the substance in question and a summary of the pharmacological action, the minimum lethal dose of practically all the compounds being included. The author deserves praise for his method of expressing the minimum lethal dose. In one formula he gives the animal used, the amount of the drug per kg. used, and the method of administration. It is to be hoped that other writers will follow this pattern of expression.

The place of the volume in the literature is not easy to assess. It does not contain enough information to make it complete in itself, whilst it is really too big to be used merely as a text-book. It shows evidence of much hard work. The information collected is accurate and a really good bibliography is appended.

Common Colds.

Cause and Preventive Measures. By Leonard Hill, M.B., F.R.S., Hon. A.R.I.B.A.; and Mark Clement. London: William Heinemann, Ltd. 1929. Pp. 126. 6*s.*

"To inform a patient" say the authors of this little work "that he is suffering from a 'catarrhal cold' is to tell him what Hippocrates might have told him 400 years B.C. . . . Such a diagnosis has some historical importance, but it has little scientific value." It is the word "cold" to which the authors particularly object, and the experiences of Nansen, the Tierra del Fuegeans, balloonists, and Dr. Chodounsky, who stood naked before his window at 0° C. for 55 minutes, and not only failed to catch cold, but cured his rheumatism, are quoted in proof of the international fallacy of talking about catching cold.

Ventilation, an open-air life, and good food are stated to be the great enemies of the cold. The kiss has a small section; "If a kiss has to be given, let it be on the forehead, or the neck." The pollution of the air by smoke, the perambulation of the infected, the abuse of alcohol and tobacco, are all included in the ætiological retinue of the common cold. In fact, to use a rather homely but appropriate phrase, it would seem to be a whole-time job to avoid catching a cold—a sentiment with which the reader's experience will concur.

A vast amount of somewhat ill-arranged information about colds is assembled in this book, but it fails to obscure the sad fact that we do not know what a cold is or how to cure it. The bacteriology of the cold is the bacteriology of the normal respiratory tract thrown out of proportion. The transmission of colds by filtered exudates from the throat of a patient would seem to suggest a filter-passing virus save that we do not know what such viruses are, and the suspicion that bacteria may have filterable phases in their life-history is shared by a number of workers. Vaccine prophylaxis is fully considered. Results are proverbially variable and often disappointing. In a closed or partly closed community, a vaccine prepared from representative and parochial colds is often efficient. But the average man, whose embraces are not always on forehead or neck, and whose places of business and methods of transit fall far short of the spartan conditions enjoyed by Dr. Chodounsky, must needs encounter bacterial enormities which the most polyvalent vaccine has not foreseen. The polyvalent vaccine is, in fact, the prophylaxis of Goliath; there is always a joint in the armour. And it is possible to argue that vaccines protect not against colds, but against their sequelæ.

It is a little disappointing to find that one of the shortest chapters in the book is that on treatment,

and that the reader will probably find his favourite cure relegated to "old-fashioned methods." But the authors, of course, are chiefly concerned with preventing colds. And, if the reader will conscientiously carry out all the advice here given on preventing colds, he will be far too busy to notice his cold when he contracts it.

HOSPITALS AND THE STATE.

A Popular Study of the Principles and Practice of Charity. By R. WESTLAND CHALMERS, M.B. London: John Bale, Sons and Danielsson. 1929. Pp. 143. 6*s*.

Dr. Westland Chalmers surveys private philanthropy and the growth of a public conscience in hospital matters in England, with due note of well-known landmarks such as the Black Death, the suppression of the monasteries, the Elizabethan poor relief statute, Dickens's novels, and the National Insurance Act of 1911. He gives full credit to the voluntary hospitals, but he finds voluntaryism precariously kept alive by an intensively stimulated charity, attacked by many difficulties of which the main root is finance, and unequal to the task of the extension of institutional agencies necessary for the prompt detection and cure of disease. Only the State, he believes, can perform this task by extending statutory hospitals of a specialist character; the present overlapping and competitive methods, he thinks, must give way to a systematic policy on the lines proposed by the 1920 Coördination Scheme of the Medical Consultative Council, otherwise known as the Dawson Report. Lord Dawson's more recent observations (on the second reading of the Local Government Bill) regarding the "official doctor" are a further warning. The book is written vigorously but with occasional lapses as when the Great Fire of London is said to have "decimated" 436 acres within the City walls. Compiled just too soon to address itself to the concrete proposals of the new local government legislation, it is nevertheless timely in its estimate of the future of State intervention based on past history.

MEDICAL ADVENTURE.

By ERNEST WARD, M.D., F.R.C.S. London: John Bale, Sons and Danielsson, Ltd. 1929. Pp. 291. 8*s*. 6*d*.

MEDICAL adventure is the well-chosen title of a remarkable book. It is a record, freely annotated, of a man with a rich experience of many sides of a doctor's life. The author has served his apprenticeship as a general practitioner, as an expert witness in medico-legal cases, and as a unit in the administration of the tuberculosis service. In each of these spheres he has shown a chameleon-like fidelity in adjusting himself to his surroundings; as a general practitioner he has had "close-up" glimpses of humanity at its best and worst; as an expert witness he has revelled in those gladiatorial joys and spectacles which the law-courts offer every day free of charge (to the spectator); and as an administrator he has acquired that atmosphere with which even those of us who are left without the pale are so intimately and sometimes painfully familiar. The author is quite at his best in the first parts of his book. Here he gives us one anecdote after another, flavoured with caustic humour, illuminating the pitfalls awaiting the unwary practitioner. Many of his anecdotes illustrate problems in obstetrics and should prove most useful as well as entertaining to young practitioners. This is not the place in which to steal much of Dr. Ward's thunder, but it may perhaps be permitted to quote him on the prolonged disability which may follow even uncomplicated fractures of the ankle. "The editor of a leading medical journal once told me that he fractured his ankle 30, or it might be 40, years ago and that it still felt 'like a testicle.' A little tender, I gathered, when he trod firmly upon it." One of the many useful lessons the author teaches as a former expert witness is the wisdom of being modest. He has both the courage and the modesty to tell stories against himself in the witness-box. In this critical age few are impressed, while many are irritated, by the medical expert who poses in the witness-box with a magisterial air and with the expression of an omniscient divinity. Were it not for the wealth of technical detail in this book, it would make excellent reading for the layman as well as for the doctor. Perhaps the author will one day bring out an edition adapted for this purpose. It should have a great success.

GENERAL MEDICINE.

Ergebnisse der Gesamten Medizin. By numerous contributors. Under the general editorship of Prof. BRUGSCH, Director of the Medical Clinic of the University of Halle. Berlin: Urban and Schwarzenberg. Vol. XII. Part II. 1928. Pp. 340. M.35.

THIS volume is the most recent of the series of the large modern publications under the above title. There are eight original articles in it on clinical and scientific medicine. The subject of the heart and circulation during sport and gymnastics is continued from Volume X. A really important contribution on radiotherapy in disorders of the thyroid gland includes biological considerations, the particular technique of the treatment of Graves's disease with radium and X rays, the therapeutic measures available in the rarer thyroid maladies, and a complete modern bibliography. The early diagnosis of phthisis by radiology is another subject dealt with exhaustively and illustrated by many good reproductions of skiagrams. Perhaps the most important article of the eight is the one on the pathology of rickets. This contains a review of the status of the disease in the light of modern vitamin research with particular reference to the place of activation of the pro-vitamins and the isolation of vitamin D. The subject matter is fortified with tables showing the broad relationships between latitude, sunshine, climate, season, and rickets. The chemical and nutritional aspects of rickets are fully summarised with a review of the experimental production of the disease. But the author's main concern is with the activation of the pro-vitamins and the identity of vitamin D. There is nothing new in a lengthy article on Hodgkin's disease but it is well amplified by charts and photographs. Other articles include one on primary glaucoma with special reference to treatment, another on bile-pigments and the chemistry of icterus, and another on the biological aspects of colloid chemistry.

DISEASES OF INFANTS AND CHILDREN.

Sixth edition. By H. D. CHAPIN, M.D., Emeritus Professor of Diseases of Children, New York Post-Graduate Hospital; and L. T. ROYSTER, M.D., Professor of Pediatrics, University of Virginia. London: Baillière, Tindall and Cox. 1928. Pp. 675. 30*s*.

TWENTY years have elapsed since the publication of this book in its original form by Prof. Chapin and the late Dr. Pisek, and the appearance of six editions in this period bears witness to its continued popularity. The new volume is slightly larger than its predecessors; it contains numerous minor additions, while the authors' original intention of describing diseases in a condensed form has been adhered to. The distribution of space is somewhat uneven, feeding and diseases of infants being treated in much greater detail than are the disorders of childhood. An interesting feature is the authors' account of the treatment of epilepsy by ketogenic diet, by means of which they have obtained results which are distinctly encouraging.

The volume is well and fully illustrated, and is likely to prove as popular as the earlier editions.

THE LANCET.

LONDON: SATURDAY, MARCH 23, 1929.

SUN-WORSHIP.

TEN years ago it would have seemed as incredible that a simple article of diet would be found to cure pernicious anæmia, as that the controversy, then acute, centring round the causation of rickets, would be settled with honours easy. The first discovery has as yet no theoretical significance; it is an isolated piece of knowledge of immediate practical value. Of far greater import is the merger of the two contradictory conclusions about the ætiology of rickets. These conclusions were founded mainly on clinical observations, fiercely upheld, that rickets could be prevented and cured respectively by (1) the administration of cod-liver oil, (2) exposure to fresh air and sunlight. The curious explanation—namely, that the avitaminosis of which rickets is the manifestation is subject to dual control, forms a warning that widespread clinical impressions, even if they seem to conflict with one another, cannot safely be neglected. We summarise in another column the comments of the Medical Research Council on artificial light among the other therapeutic innovations reviewed in their report for 1927–28. It is good that the physiological bases so far established for such treatment should be clearly defined and that our deficient knowledge of the way in which light acts should not be masked by jargon. But the scepticism implicit in the report as to any effect of artificial sunlight other than the production of vitamin D or of a local inflammation in the skin has aroused protests from quarters which cannot be disregarded. The aspect of the subject first criticised, chiefly on economical grounds, is the tendency to choose ultra-violet light rather than foodstuffs rich in vitamin D for the prevention and cure of rickets. The physical method of treatment costs, according to the report, some 50 times more than the dietetic one. This point was well worth making in view of the vast expenditure incurred in the purchase of apparatus, and should be seriously considered by public bodies as well as by individuals. It must not be forgotten, however, that little is known of the mechanism whereby the vitamin promotes calcification. Certain children, for example, in whom there may be a defect in assimilation, are said to respond better to irradiation than to oral treatment. Moreover, the number of children suffering from minor degrees of fat indigestion is probably larger than is generally supposed. It is small points like these—very important although small—which must tell against the infallibility of general conclusions.

Interesting is the suggestion that in producing a local inflammatory reaction the artificial sunlight has no advantages over a mustard plaster, and we may here recall the existence of two distinct schools in light therapy. One set of observers do indeed challenge a comparison with earlier and simpler methods of producing hyperæmia, for their definite object is to cause an erythema, and they warn their patients that some degree of redness, swelling, tenderness, and subsequent peeling is to be anticipated. The other group regard such a reaction as a definite sign of over-stimulation and aim at sub-erythema dosage. This latter technique will be swept outside the realm of therapeutics if the future brings confirmation of the doubts expressed by the M.R.C. about the general beneficial effects of irradiation. But how exactly could these subjective effects be estimated? We cannot, for example, measure the exhilaration associated with a fine sunny day in basal metabolic or pulse-rates; it is surely independent of the movement of cold crisp air against the body surface, though stimulation may be enhanced by this contact. After a spell of cloudy weather, in summer as in winter, the appearance of the sun gives a pleasure, a relief from tension which is a common heritage of mankind. Tedious journeys undertaken by the rich in winter time, the grumbles of the people after a dull summer—it is unnecessary to reiterate the evidence of a real craving for sunshine, for none deny it. The point at issue is rather whether this craving can be satisfied, or somewhat satisfied, by artificial means. Many of the victims of the craving affirm that it can, and there is no more reason to doubt their subjective evidence than the impressions of their doctors. The brilliant artificial illumination now available in all civilised households has not been accepted as a substitute for sunlight, but the discovery that at least a few of the missing rays could be supplied from a new source naturally led to renewed experiments. A large number of people are convinced that irradiation appeases their longing for the sun in winter time and that it has definite tonic properties. What their need has been, and whether it will ultimately be expressed in terms of alteration in protoplasm or pigment, are still unknown. But because vitamin formation, pigmentation, and local inflammation are the only physiological changes as yet appreciable it is surely premature to infer that no others are derived from exposure to artificial sunlight. Experiments carried out by Dr. HELEN MACKAY in 1925 certainly appear to show that a belief in the general therapeutic value of ultra-violet light is unfounded—and confirmation of this comes from an experiment carried out on behalf of the Council by Dr. DORA COLEBROOK in the Willesden school area. The report of the M.R.C. points out that there are no published controlled experiments to set against these findings. That may be so, but there is a considerable body of clinical opinion in support of ultra-violet light, even though it is not supported by scientific evidence. And unfortunately scientific evidence in such a vague condition as general wellbeing must be difficult to obtain. Further, it is possible that other clinical observers might have drawn different conclusions from the experiments quoted, while the fact that in the experiments the "controls" were found to be less prone to minor respiratory ailments than the irradiated children suggests, if it suggests anything, that the rays were not entirely inert. The point may be granted that exercise and fresh air are greatly preferable to indoor sessions around a lamp. But is daily exercise in the fresh air always a possibility for schoolchildren in our cities during our long winters? The Council is equally doubtful as to the value of irradiation in the treatment of acute and chronic infections. It will probably be generally admitted that observations on the bactericidal power of the shed blood do not provide sufficient justification for the use of ultra-violet light in inflammatory conditions. But the same might be said of many other accepted methods of treatment, for we do not know with scientific certainty how far the in-vitro immunity

phenomena are accurate expressions of the powers of resistance of the living body.

While thus adducing some of the arguments in favour of a form of treatment which has not only achieved great popularity, but is believed by many clinicians to merit it, we are deeply impressed with the force of the criticisms levelled against its indiscriminate use. It would obviously have been desirable, had it been possible, to organise a trial of light therapy before accounts of its reputed benefits were so blindly accepted by the public. The method, however, has escaped from rigid scientific control, and its ultimate value can now only be assessed by the long and uncertain method of clinical observation. But the story of rickets, with which we started this discussion, gives ample reason for confidence that in the long run neither medical men nor the public can be deceived, and that if they continue to uphold any form of treatment its scientific value will eventually be established.

MEDICAL POLICY IN INDIA.

IT is with mixed feelings that we comment on two addresses, delivered by eminent members of the "independent medical profession" in Calcutta in December last, at a gathering styled the All India Medical Conference. Both Sir NILRATAN SIRCAR and Dr. G. V. DESHMUKH, whose addresses have now reached us, as their medical and other distinctions show, have attained a high status in the profession. Their opinions must command a hearing, and the animus displayed in their orations on this occasion is all the more regrettable on that account. What ground exactly the conference in question set out to cover is not apparent, but Sir NILRATAN, the chairman of the reception committee, and Dr. DESHMUKH, the president of the conference, concerned themselves almost entirely with medical politics in various aspects, and the relations of the independent profession with the Government medical services, and more particularly the Indian Medical Service. It is admitted at once that the work of the medical services, vitally useful as it has been in the development of the country, is open to adverse criticism in certain respects—the sort of criticism which may be levelled at all the European services in India. It is true that in the past the tendency of the official medical men has been to do the responsible work themselves, and to train up their Indian assistants in a subordinate capacity. It is also true that a certain amount of jealousy existed with regard to remunerative appointments and practice, and that vested interests and service claims were sometimes allowed too serious consideration. Then, again, students of the medical colleges and schools had certain real grievances. It has been too much the custom to change professors round from one subject to another, as convenience dictated, without sufficient reference to special qualifications, and teaching has sometimes suffered from this cause. Training in the later years of study and early post-graduate life was likewise adversely affected by the practice of filling house appointments in hospitals by members of the permanent subordinate services, and other handicaps exis ed which it will take time completely to get rid of. But when eminent Indian physicians say that the British in India have been unprofitable stewards—that Government has done practically nothing for education—that their neglect of irrigation has turned a land of peace and plenty into a home of stark want and fell disease—that the people are decimated by diseases of foreign importation—and that alien authority has only a sneer of indifference for genuine merit—it is unnecessary to deny the charges; we ask what place diatribes of this nature have in a medical conference?

The speakers came to more appropriate subjects when discussing the prospective Bill for the constitution of a central medical council for India, though even here racial bias becomes at once apparent in the terms employed. The proposed legislation, one of the most important objects of which is to put the Indian Empire in a better position to negotiate with other countries, and to maintain and enhance the reputation of its medical degrees in the eyes of the rest of the world, was regarded with quite unreasonable suspicion and the views of the conference will be widely reflected. It is suggested that the proposals are the sinister product of an alien bureaucracy (although the department directly responsible for the measure is almost entirely in the hands of distinguished Indians), and that the new central council will be subordinate to the General Medical Council of Great Britain. Hostility to the General Medical Council appears to be a sort of obsession, though people well qualified to know have pointed out over and over again that any intervention by that body in Indian affairs has always been confined to the protection of the interests of the general public at home, while its advice has been of the utmost assistance to India. Do the critics of the Council know what percentage of its work of recent years has dealt with Indian as well as with Colonial affairs? Constantly the President has himself dealt with important Indian matters, while the Council, as a body, has frequently been resorted to for advice on difficult phases of medical policy in India, when applications have always met with a ready and sympathetic response. The suspicious attitude which the spokesmen of the independent profession in India too frequently adopt towards the Council is therefore neither grateful nor well advised, and it is most unfortunate that the same attitude should be adopted with regard to the efforts of the Indian Government to create a body to regulate education, and to meet foreign criticism with regard to the status of the country's medical qualifications abroad. The same distorted and supersensitive nationalism is to be seen in the proposal put forward at the conference with regard to the establishment of chairs in Ayurvedic and Yunani medicine in the medical colleges—this as an extra burden on students who it is contended are already overweighted with a curriculum imposed on them largely through the malevolent machinations of the alien General Medical Council. Persistent ventilation of this matter has always led to the opinion among those who look temperately at the situation that the indigenous systems, however interesting from a historical standpoint, can have no place in a course of study devoted primarily to modern scientific medicine.

It is pleasant to note that Sir NILRATAN SIRCAR ends in a loftier and more reasonable vein by exhorting Indian medical and sanitary experts to devote themselves to investigating various social problems which call for attention; to study the factors which lead to excessive child and maternal mortality, the bearing of defective marriage customs on vitality and fecundity, and the effect of faulty diet and nutrition on various diseases. In these and other similar spheres racial jealousies and ancient differences may surely be disregarded. Meanwhile it is opportune to draw attention to the very liberal reforms which are now in course of introduction in the medical schools and colleges and attached hospitals. A cursory examina-

tion of the staffs will show to what an extent the leading educational posts are already held by Indians. Resident hospital appointments are also being increasingly thrown open to the newly qualified non-official men, and, as one of those whose addresses are here under consideration observes with not unnatural satisfaction, most of the lucrative practice of the larger towns has already found its way into Indian hands. These changes, one would think, should go far to meet the aspirations of independent Indian practitioners, and to reconcile them to the retention of what, after all, in relation to the total population of the country, is only an insignificant number of posts in the military and civil medical services, to serve the needs of the rapidly diminishing Europeans in the army and civil services. But apparently nothing short of the total exclusion of Europeans will satisfy these reformers. If no other reason existed against this course, we may remind them that Western science is a plant of comparatively recent growth in the east, and that it would be strange indeed if it were yet ready to flourish alone without external support.

THE NATURE OF FILTRABLE VIRUSES.

Two recent discussions at the Royal Society had for their subject the ultra-microscopic viruses infecting animals and plants. A large number of diseases in both categories are at the present time commonly attributed to viruses, though the definition of this class of pathogenic agents is not very clear. The character by which a virus is distinguished from other causes of infection are chiefly negative although attempts have been made to find more positive features distinctive of the group. By a virus is usually understood an infective causal agent which cannot be recognised or clearly seen by the microscope; this does not exclude the possibility that the virus particles are just visible in a stained film or by the dark-ground illumination. It has been generally held that all viruses are filter-passers—that is, consisting of particles too small to be stopped by an ordinary bacterial filter. It was this property which first attracted attention to the group, when IVANOVSKI filtered the virus of mosaic disease of tobacco in 1892, and LOEFFLER and FROSCH that of foot-and-mouth disease in 1897. It is now recognised that so-called viruses vary much in the ease with which they penetrate filters. Some like the two just mentioned pass very readily through such filters as a Chamberland III. or a Seitz disc under conditions in which these are quite impermeable to ordinary bacteria. The viruses of distemper and herpes can with proper precautions be obtained in the filtrates but are often retained by the candle. Certain infective agents such as that of typhus fever, which were at one time supposed to be filtrable, are now generally believed not to appear in the filtrate unless the conditions are such as also to allow passage to the smallest bacteria. Filtrability is not a function merely of the size of the essential particles in a virus but also depends on their tendency to adhere to the walls of the filter on account of their surface tension, electric charge, and other properties. In some cases, however, retention by a bacterial filter probably gives a useful indication of the average or minimum size of the active particles in the virus concerned. The rickettsia bodies associated in lice with the virus of typhus are usually at least 0·2 μ in diameter and do not pass through filters for that reason. It may be chiefly on account of the similar or slightly smaller size of the elementary bodies described by PASCHEN and by BORREL, and present in the lesions of vaccinia and fowl-pox, that the viruses of these diseases are not filtrable in the hands of most observers. BEDSON has shown that the virus of herpes, unlike that of foot-and-mouth disease, can be concentrated by centrifugation, and this, taken with the relative filtrability of the viruses, suggests that the particles in herpetic virus belong to a grade in size between that of vaccinia and foot-and-mouth disease. No evidence as to the filtrability of many plant viruses can be obtained because they have only been transmitted by grafting, never by injection.

The third negative property which characterises the group of viruses is the inability of the agent to grow on artificial media. The micro-organism of pleuro-pneumonia in cattle is probably often smaller than the rickettsia of typhus, but like this it is not now reckoned among the viruses as it produces well-defined colonies on solid media. Although the well-accredited viruses cannot be propagated in vitro, they can be shown to multiply in the animal host and often to increase rapidly at some favoured site in the body where the concentration may reach a very high titre, as in vaccinia and foot-and-mouth disease. Obligatory parasitism, then, is one of the most striking and distinctive characters of the viruses and it also presents a very troublesome obstacle to investigation. The absence of all knowledge of truly filtrable forms of life which are not parasitic is a fact which awaits explanation. It might have been expected that, if such minute forms really possessed independent life, similar agents capable of assimilation and multiplication in vitro would have been discovered by their chemical activities. It is only in the region where the size of the borderland viruses—e.g., those of typhus and vaccinia—is approached that facultative saprophytes such as the microbe of pleuro-pneumonia and Olitzky's *B. pneumosintes* are known. In consequence of the inability to secure multiplication of a virus except in living tissues, the idea has been put forward, especially by DOERR, that a virus may not be living but rather catalytic in nature. It is suggested that increase of the virus is due to the living properties of the host, which as the result of stimulation by a small amount of virus reacts by producing fresh virus in large quantities owing to an unwonted or pathological metabolic activity. The notion has recently been examined and commented on by BOYCOTT. This hypothesis has been especially fostered by the study of two virus-like agents, the lytic agent or bacteriophage discovered by TWORT and D'HERELLE, and the filtrable virus of fowl sarcoma. The former, which passes freely through a porcelain filter and resists exposure to a temperature of 60° C., is regarded by D'HERELLE as a parasite which lives and multiplies in susceptible bacteria. There is no doubt much to be said for this view which D'HERELLE supports largely on the ground of the adaptability of the phage to new bacterial hosts. It is, however, opposed by BORDET and by BRONFENBRENNER, and the virus is said occasionally to appear de novo in previously unaffected cultures. The filtrable virus of fowl sarcoma has a very strong claim to be considered an independent living microbe, and is indeed so regarded by GYE and many others. There are difficulties, however, in admitting the very similar mammalian malignant growths into the same category, especially since some of the latter can be produced at will by the use of tar and other chemical substances.

Little difference can be detected between the behaviour in the body of pathogenic bacteria and the

majority of viruses, but our knowledge, especially of the latter, is very imperfect. Important features of disease such as the incubation period, infectivity, and immunity reactions can be paralleled in the two classes, though some minor differences have been claimed in the behaviour of the antisera. The adaptation of the agent to new species of animals and plants by passage is a common feature of diseases which are due to viruses, bacteria, or protozoa. It has been possible to secure the multiplication of the viruses of certain diseases (vaccinia, Rous sarcoma) in cultures of living tissue in vitro, but this cannot be accepted as conclusive evidence of independent life. Research with unseen and uncultivated viruses is a very different thing to dealing with bacteria or protozoa. Every determination of the presence, potency, or increase of a virus must be made by tests for infectivity. The investigation of virus diseases of plants is in some ways still more complicated than when animals are concerned. Many plant viruses can only be transmitted by grafting and the proof that a plant is, or is not, a healthy carrier must be obtained by grafting it on a susceptible stock. The recent advances in ultra-microscopic photography applied to the study of viruses have not yet reached a point where they can give practical assistance. On the whole the evidence and balance of opinion, though by no means unanimous, are in favour of the view that most viruses are living agents, but on account of their peculiar qualities an irrefragable proof seems to be unattainable by existing methods.

Annotations.

"Ne quid nimis."

THE KING.

WE published in THE LANCET of March 9th the official bulletin issued from Craigweil House on March 2nd. Another bulletin was issued from the same residence in the evening of Saturday, March 16th, as follows: "His Majesty the King is steadily, though slowly, regaining health. In strength, vigour, and appearance improvement is definite. The weather is restricting the opportunities for going outside the house. The ray therapy is being continued." The bulletin was signed by Sir Stanley Hewett and Lord Dawson of Penn.

A LABORATORY SERVICE FOR INSURED PERSONS.

THE fact that while money can be found for almost any sort of treatment for insured patients none is available for diagnosis has long been recognised as one of the most serious deficiencies of the National Heath Insurance Acts. The necessity for a laboratory diagnostic service was recognised by the Royal Commission of 1924–26, and the demand for such a service has been growing in strength ever since, but on the plea of lack of funds the Government has taken no steps in the matter. Meanwhile various insurance committees have attempted to make such service available for patients under their charge. Their schemes have differed widely; some have been of such a nature as to throw upon the rates a charge which ought to fall upon insurance funds, others have depended upon arrangements between insurance committees and voluntary hospitals of a type which under the Act of 1928 became ultra vires. There seemed, indeed, to be a risk of the establishment of a series of totally unrelated schemes, without proper supervision, some of them illegal and the result being chaos.

It was partly with a view to meeting this threatened situation that the British Pathologists Association was formed two years ago. As a result of representations from this Association the British Medical Association decided to constitute a consulting pathologists group, which since its inception has been working to produce some practicable scheme for the provision of diagnostic facilities for insured persons. It is regarded as inevitable that the charges should fall for the time being at any rate upon the patients receiving the benefit of the service—that is to say, the patient pays the laboratory fees through his practitioner. Although it is essential for fees to be kept low, the group sees grave dangers in throwing such work open to free competition, with the possibility of fee-cutting and lowered standard of work. It has therefore drawn up a schedule of minimal fees for the ordinary laboratory procedures of general use in clinical medicine. These fees have been calculated on a basis of time and laboratory costs and are designed to provide a reasonable remuneration to a laboratory performing such work at full pressure. A list has been compiled of pathologists in charge of suitable laboratories who are willing to undertake this work at the standard rate of fees. The country has been divided into convenient areas, and insurance committees will, if the scheme is adopted by the representative meeting at Manchester in July, be notified of the pathologists within their area willing to undertake this work. The scheme as it stands will be of undoubted assistance to panel practitioners, but it suffers from the grave drawback of being financially dependent upon the insured patient, who for the most part is not yet educated to spend money on mere diagnosis. Accordingly the volume of work under the scheme at the outset may not be great. Such a service is, however, badly needed, and when funds can be found for its administration as part of medical benefit under the Insurance Acts the existence of a working scheme should save much trouble.

THE PREVALENCE OF APPENDICITIS.

So various are opinions on the incidence of appendicitis among non-European races that Dr. Elsa Uhlenhuth,[1] of the Tübingen School of Tropical Medicine, has made a special study of the literature in the hope of getting at the facts. The general impression is that native races suffer little from appendicitis, but Dr. Uhlenhuth is not sure that this is correct. The greatest mass of information comes from China, where it is the most experienced physician that reports most cases. Many do not come to notice, the Chinaman being slow to consult the foreign doctor, especially for abdominal trouble, for which these "foreign devils" are apt either to prescribe a starvation diet, very unpleasant to a Chinese, or an operation whose outcome is uncertain. The patient, therefore, trusts himself to his domestic remedies, notably opium, which at worst gives him the painless death which he prefers to a life of discomfort. Dr. Uhlenhuth notes that the reports consulted are seldom statistical; rarely does the reporter state what he means by "few" or "many." Much is said about diet being the cause of the disease, but little exact information is given about the diet concerned. There are some who say appendicitis is rare in non-Europeans by reason of the different anatomy of their appendix, but no such difference has been proved. The conclusion reached from this survey is that while appendicitis occurs in all races of men of whom we have information, although few figures are available to show relative frequency, it does seem to be less common in Indians than in English people living in India; also few cases have been reported from Africa. To provide a standard we may say that in the years 1924–26, among an average of 290,000 men in the Army and the Navy, case-rate per 1000 was as follows: (1) In the Army: officers, at home 9,

[1] Arch. für Schiffs- u. Tropen-Hygiene, 1929, xxxiii., 105.

abroad 7¼, in all 8¼; other ranks, at home 5, abroad 4¾, in all 4¾. (2) In the Navy (officers and men), at home 4½, abroad 4½, in all 4½. The figures for the two services together were: at home 5·0, abroad 4·6, in all 4·8, but, of course, many slight cases are included.

THE METABOLISM OF CHOLESTEROL

CHOLESTEROL plays a very important part in the body, being an integral constituent of all living cells, and particularly associated with the brain and nervous system. The importance of the group of sterols to which it belongs has been further emphasised by the recent discovery that irradiation of sterols leads to the formation of vitamin D. O. Rosenheim and T. A. Webster, it is true, showed[1] that cholesterol itself is not the precursor, but the closely related substance ergosterol which is contained as an impurity in cholesterol from animal sources and only with difficulty removed from it. In other respects, too, our knowledge of cholesterol metabolism is very incomplete. The substance is supposed to originate mainly in the vegetable kingdom, although a number of workers have shown that it can be synthesised by the animal organism. The cortex of the suprarenal gland plays an important part in this synthesis, but the nature of the parent substance remains obscure. Prolonged feeding on diets containing very large amounts of cholesterol causes a definite increase in the amount of this substance circulating in the blood plasma; J. A. Gardner and H. Gainsborough have, however, shown[2] that there is no increase as the result of a single meal. The change in the cholesterol content of the plasma during the process of digestion is taken to indicate the simultaneous occurrence of an active endogenous metabolism in which cholesterol takes part.

Accurate information concerning the quantitative distribution of cholesterol in the body is of comparatively recent origin, since suitable methods of analysis have only developed during the past 15 or 20 years. Most of the studies have centred round the determination of the substance in the blood, and its variation in health and disease, with a view to the possible use of chemical examination as a means of diagnosis. The results of such researches have not as yet made it possible to assign any very definite diagnostic value to these determinations except in certain cases. It is, however, generally recognised that in the later months of pregnancy, in certain forms of nephritis and nephrosis, in biliary obstruction and variably in diabetes mellitus, an increase occurs in the blood-cholesterol. On the other hand, the amount may be lowered in pernicious anæmia and in infective conditions, and these changes are so well marked that their occurrence is often unmistakable. Attempts to extend these observations to other conditions have in general been less successful, for the reason that the changes concerned, if any, are of smaller range and because our knowledge of the variation of the normal cholesterol content is incomplete.

Gardner has laid special emphasis upon the proportion of cholesterol present as the free substance and that present as ester. It has long been known that the cholesterol in the blood exists largely combined as esters, particularly in the plasma where the average ratio of ester to free substance may be of the order two to one. The ratio is variable, and various authorities do not agree as to the exact figures, doubtless due to the use of different analytical methods. On the other hand, the red blood corpuscles probably contain cholesterol mainly in the free state. Accurate determination of the combined cholesterol requires previous precipitation of the free substance with digitonin, a somewhat laborious method necessitating the use of 20 c.cm. of blood. Probably for this reason most workers have determined the total cholesterol, using a simple colorimetric method requiring only 1 c.cm. of blood. However, as Gardner points out, the implied assumption that free and combined cholesterol have the same significance is by no means proven. E. Goodall has recently exposed in our own columns[3] the slender basis for the assertion that there is a regular menstrual fall in the blood-cholesterol. In our present issue Gardner and Gainsborough describe the disturbance of cholesterol metabolism which occurs during pregnancy; in agreement with earlier observers they find a rise in the free cholesterol of the plasma up to a maximum at about the thirtieth week of pregnancy with a concurrent fall in the combined sterol. The occurrence of increased amounts of free cholesterol in the later stages of pregnancy has led to the assumption that the pituitary gland, which F. H. A. Marshall has shown to be increased in activity at this time, is the stimulus to the mobilisation of fat from the adipose tissues. R. Coope found that injection of pituitrin into rabbits caused a considerable increase of fat in the liver. Possibly the increased concentration of fat and cholesterol in the blood during pregnancy is necessary in order to supply the fœtus with these materials. Such questions as these are unanswerable until our knowledge of normal cholesterol metabolism is more complete than it is at present.

[1] THE LANCET, 1927, i, 306.
[2] Biochem. Jour., 1928, xxii., 1048.

TULARÆMIA IN DOMESTIC ANIMALS.

SINCE McCoy and Chapin in 1911 first succeeded in isolating the organism of tularæmia (*Bacterium tularense*) from the lesions of infected ground-squirrels in California, it has been ascertained that the virus may be harboured by many different hosts under natural and experimental conditions. The first demonstration of human infection was made in 1914 by Wherry and Lamb in cases of ulcerative conjunctivitis accompanied by fever and glandular enlargement, but the disease as a clinical entity dates from observations in the State of Utah since 1908, or earlier on cases of what was known locally as "deerfly fever." It was not, however, until 1919 that Francis established the fact that these cases were due to tularæmia infection conveyed to man from jack-rabbits by the biting fly, *Chrysops discalis*. In 1923 the organism was isolated from infected rabbits exposed for sale in the Washington market, and was shown to be the cause of a condition, known to the trade as "rabbit fever," among rabbit skinners and dressers. Since then human cases have cropped up in many States of the Union and the disease has also been reported from Japan. In 1926 three fatal cases, almost certainly due to rabbit infection, were reported from Virginia. Besides other transmitting agents, infection may be conveyed by means of the wood tick, *Dermacentor andersoni*, which apparently can determine the continuance of an epizoötic among rodents and may possibly carry infection to man. Other animals susceptible to natural infection are the coyote and the wood mouse, but hitherto the condition has been rarely noticed in domestic animals, of which the calf, pig, and goat appear to be quite resistant, and it is only recently,[4] in the State of Montana, that the virus has been detected in the blood of dead and dying sheep, and in dermacentor ticks removed from the bodies. So long ago as 1923 heavy losses among sheep, coincident with high mortality among jack-rabbits, were observed in these districts, and now that their cause is recognised, the question naturally arises how far such conditions among sheep and rabbits are of importance to the general public, not only in the countries immediately concerned but elsewhere, and what danger, if any, there is of importation. Further work is necessary to determine whether the meat of slaughtered sheep is a possible source of human infection. It seems that the principal peril lies with those concerned

[3] THE LANCET, Feb. 23rd, p. 384.
[4] Parker and Dade: Public Health Reports of the United States Public Health Service, 1929, xliv., 126.

with the dressing of the animals for sale, infection being definitely possible through contamination of the hands and eyes with infected tissues or through the excrement and tissues of ticks. With sheep the chance that infection may reach the market and be a source of danger to persons in slaughter- and packing-houses and to the consuming public generally is more remote but cannot be excluded, especially if animals are slaughtered for immediate local consumption. The importation of the virus into this country is even less probable, but is by no means impossible.

A MEANING FOR SYNERGISM.

"SYNERGISM" is a term that has been freely and loosely used in connexion with anæsthetics. It is doubtful whether those who introduced the word in describing experience with anæsthetic drugs had a clear conception of what they meant by it, and it is obvious that most of those who have since talked of synergistic action have no such conception. We are glad to see that criticisms levelled against the very existence of what is presumably meant by synergism have produced a reply from J. T. Gwathmey[1] in which there is, at any rate, a definite idea of "synergism" as represented by the combined action of magnesium sulphate and morphine. Gwathmey claims, on apparently good clinical grounds, that the pain-controlling action of morphine is greatly prolonged when it is used in conjunction with magnesium sulphate. He does not claim an increased power for the action of the morphine but merely a prolongation of its effects. Here, at least, is something definite to go on, if in the future the term "synergistic action" is confined to the ability of one drug to prolong the effects of another. In the past their meaning in this connexion has been vague, different, and inaccurate. The word "synergism" might apparently just as well have been used to describe the ordinary sequence of "gas and ether," after morphine and atropine, as any other combination of sedative and anæsthetic drugs.

From the more general pharmacological aspect the inherent difficulties of the question of "synergism" have been aggravated by loose thinking and by a loose use of the term. It would be preferable if it were employed in its purely literal significance—viz., that two or more drugs when administered in combination *work together* in the sense that they do not antagonise each other. The result would then be the simple arithmetical summation of the effects of each individual drug. There are numerous examples of synergism of this nature in practical therapeutics. It is utilised, for instance, in the case of purgatives and diuretics to secure the summation of the desirable effects of several drugs, while the side actions are not increased or may even be neutralised. But synergism is often employed in the sense that the combined action of two or more drugs is greater than could be calculated from their individual effects. *Potentiation* in this case is the term much to be preferred. The best studied examples of this type of action are in the narcotic group, where there is a certain amount of evidence to suggest that when alcohol, chloroform, or ether are administered together the result is a simple summation of their effects, while the addition of certain alkaloids such as morphine and hyoscine gives considerable potentiation. But it must be recognised that in the commonest and most apparent example of potentiation—viz., "twilight sleep"—it is seriously doubted by competent authorities whether there is any real potentiation of morphine by hyoscine. Experimental evidence in support of potentiation is difficult to obtain, and it is still more difficult to explain its mechanism. But it is certain that the changes in the human body produced by disease often modify the effects of drugs to a remarkable extent, and there is nothing inherently improbable in the idea that one drug may so alter the condition of the body as to render it more susceptible to the action of another drug, though it may be impossible at present to explain how this happens.

[1] Jour. Amer. Med. Assoc., Dec. 8th, 1928.

VOCATIONAL GUIDANCE.

DURING the last ten years a considerable amount of research has been directed towards the parallel problems of vocational guidance and vocational selection—the discovery of the most suitable employment for the individual worker, and the selection of the most suitable workers for any given employment. The "square peg in the round hole" has become a synonym for inefficiency, and it is the object of this type of research to remove this anomaly, unfortunately so common because of the random manner in which many, perhaps the majority of, children leaving school drift into employment. Two bodies have been engaged in these investigations: the Industrial Fatigue Research Board, which is itself a branch of the Medical Research Council, and which began a number of inquiries into industrial conditions during the war; and the National Institute of Industrial Psychology, which was established in 1921, and has concerned itself chiefly with vocational problems. Both bodies have issued reports from time to time, and the latest brochure[1] records the results of an investigation, carried out by the former body for the latter, dealing with the "Use of Performance Tests of Intelligence in Vocational Guidance." Besides these official researches, much valuable work is being done by several large firms, who have appointed psychologists to work out the best methods of selection for the purposes of their own special work. Some local education authorities are also endeavouring to discover better means of advising children leaving school regarding choice of an occupation.

The problems are not easy of solution. For any efficient scheme of vocational guidance there must first of all be some grasp of the qualities of mind or skill required in different occupations; and, secondly, there must be some reliable scheme for testing these qualities in candidates. The difficulty arises from the complexity of human psychology, about which there is still far from universal agreement. On the whole there is now fairly general acceptance of the thesis that, running through all mental activities and conditioning them, there is a factor of general intelligence, known to the scientific psychologist as "g"—a factor varying in individuals according to the normal curve of variation. Besides this, however, there is a multitude of specific factors, specific to individual capacities and skills, memories and reasoning capacities, mathematical capacities, manual ability, mechanical constructiveness—to give only a few examples. There is still much difference of opinion whether in relation to mechanical trades there is a general mechanical ability contributing to them all, a general power to appreciate and deal practically with spatial relations; or whether there are only specialised capacities, functioning in one or a few definite directions. This point is discussed in the report now issued. The performance tests employed are well known to mental testers—the Porteus mazes, the cube imitation and cube construction tests, Dearborn's formboard, Healy's picture completion tests, Woodworth and Wells's substitution test, and a few others. All were found to correlate to considerable degree with "g," although not so closely as the more verbal types of tests of the Binet pattern. Specific factors played a larger part than in the Binet tests, but while certain correlations suggested that there was another general factor of "spatial relations" affecting success in several of these tests, it was not felt that the evidence was conclusive for any general non-verbal or practical ability factor. To use these tests, then, as a group from which to draw conclusions is impossible; each test must be taken separately,

[1] Medical Research Council: Industrial Fatigue Research Board. Report No. 53. H.M. Stationery Office. 2s. 6d.

its specific meaning sought for in order to estimate its vocational significance. A preliminary application of a few of the tests to groups of carpenters, fitters, electricians, and smiths appears to support the idea that they may be of value vocationally.

The results of this investigation are therefore somewhat limited, but the complexity of the problems for solution makes progress inevitably slow. The more empirical factory method of trying out tests to gauge capacity in a specific occupation may produce more rapid practical results, but for a thoroughly sound scientific basis and coördination of the work, investigations such as the present are essential. In addition they will make a valuable contribution to our understanding of human psychology, especially in its non-linguistic aspects, formerly somewhat neglected. It should scarcely be necessary to insist upon the importance of the factor of interest in psychology and in work. It is possible that the factors, interest and capacities, run more or less parallel, but the parallelism is not absolute, and vocational guidance schemes will have to guard themselves against the possible danger of placing a man in work in which he is not interested, assuming, that is, that the conditions of modern industry with its infinite subdivisions, allow any place for human interest.

THE RATIONALE OF THERAPEUTIC PNEUMOTHORAX.

WHEN Forlanini introduced artificial pneumothorax as a method of treating pulmonary tuberculosis, he said that a cure could only be obtained by keeping the lung in a state of complete immobility for two years or more. Murphy and his co-workers, on the other hand, regarded functional and not absolute rest as the essential, and it is now well known that many tuberculous pulmonary lesions can heal satisfactorily even when incomplete collapse, with respiratory movement of the affected lung, is maintained for a period. Stuart Tidey,[1] indeed, denies the possibility of complete immobilisation of the lung by induced pneumothorax, and considers that although rest is an important factor in the arrest of active disease of the pulmonary tissues, it is not the only one, and not the most potent. Remarking that no ulcer, whether on the inside or on the surface of the body, can heal if the edges are subjected to continued tension, he gives it as his opinion that healing of ulcerative pulmonary lesions can only be looked for if relaxation of the peripheral pull on the diseased area has been secured. This relaxation of peripheral tension may be brought about in various ways—e.g., by compression of the chest wall by strapping, or by special splints, by artificial pneumothorax, or by thoracoplasty. Nature herself tries to diminish the peripheral pull by making the chest wall contract over a fibroid lesion in the lung. In an original contribution [2] entitled Pneumothorax Expérimental, C. B. Udaondo and A. Vadone, of Buenos Aires, have produced some evidence which supports this contention that a collapsed lung is not at rest, and that the principal effect of pneumothorax is to diminish the distension of the pulmonary parenchyma. In an attempt to reproduce the conditions obtaining in a pneumothorax cavity, they placed the lungs of a freshly killed rabbit in a half-litre bottle, and tied the trachea to a tube passing through a rubber cork which hermetically sealed the bottle. Another tube connected the cavity of the bottle with a 10 c.cm. syringe, whilst a pneumothorax needle of proportionately reduced calibre was also passed through the cork into the bottle and connected it with a Küss pneumothorax apparatus and manometer. The investigators were thus able to set up either negative or positive pressures in the bottle, and so either distending or collapsing the lungs; at the same time they could imitate the rhythmic movements of respiration by moving the piston of the syringe. They found that even the smallest oscillations of the manometer corresponded to the movements set up by the distension and retraction of the pulmonary alveoli. It is wrong to suppose that, if a pneumothorax is present, the lung must necessarily be completely immobilised; Udaondo and Vadone show that when the lung is entirely collapsed it offers less resistance to an inspiratory dilatation than when it is distended—that is to say, that the manometric oscillations are deeper and respond more quickly to the least pulmonary movement when the lung is collapsed. They regard the term "average pleural pressure" as a theoretical figure obtained sometimes by calculation and occasionally by artifices of manometric technique. The lung is never subjected to a fixed pressure, as it responds to the least fluctuation of pressure taking place in the pleural cavity. But, being given these fluctuations, the figure which most accurately shows the degree of collapse is that which corresponds to the end of expiration.

[1] Compression of the Lung in the Treatment of Pulmonary Lesions. London, 1927.

[2] Arch. méd-chir. de l'appar. resp., 1928, iii., 363.

OPHTHALMOLOGY IN RELATION TO RESEARCH.

IN an address which he gave to the recent Indian Science Congress at Madras Lieut.-Colonel R. E. Wright pointed out various directions in which ophthalmic research has of late advanced our knowledge of general as well as of ocular pathology. As an instance of the former he cites ophthalmoscopic observation of the retinal vessels, by means of which, he says, we are enabled to gauge, more accurately perhaps than by any other method that can be applied during life, the probable changes which take place in the cerebral vessels. The fact that these observations may now be recorded accurately and scientifically by means of photography enhances their value. The chief advances in ocular pathology in the narrower sense Colonel Wright finds in the invention of the slit-lamp, by means of which the nature of the anterior structures of the eyeball can be studied more in detail than before, investigations into the causation of cataract in connexion, on the one hand, with the chemical nature of lens protein, and on the other, with alterations in the fluid available to the lens for its nutrition. It is admitted that these investigations have not as yet advanced to the point of providing results clinically available. In connexion with trachoma the late H. Noguchi's bacteriological researches as to its cause are mentioned, though as yet his results lack confirmation by others. Other important works referred to as illuminating special branches of ophthalmology are Prof. Arthur Thomson's work on the anatomy of the human eye, Prof. A. Onodi's work on the nasal accessory sinuses, Miss Ida Mann's book on ocular embryology, published last year, which throws considerable light on the genesis of certain congenital defects, and the researches of W. S. Duke-Elder on the circulatory conditions of the fluids of the eyeball, which increase our knowledge of the pathology of glaucoma and foreshadow the possibility of advances in the future in the medical as opposed to the surgical treatment of that affection. Colonel Wright concludes with a reference to Sir John Parsons's recent work, "An Introduction to the Theory of Perception," in which the abstruse problems connected with the philosophy of vision are lucidly discussed.

THE SUPPLY OF DENTISTS.

THE Dentists Register for 1929 which has just been issued[1] contains 14,388 names, a diminution of 188 on the previous year. The number of names added by registration during the year 1928 was 261 in the British list, 1 in the Colonial, and 2 in the Foreign. Twenty-two applicants were registered under the

[1] London: Published for the Dental Board of the United Kingdom, 44, Hallam-street, W., by Constable and Co., Ltd. 12s.; copies for previous years, 1s.

Dentists Act of 1921, the others on account of registrable qualifications. Of the 703 names which appear last year and not this, 201 were removed from the Register on evidence of death, 3 by disciplinary action, and 499 for other reasons, including failure to supply notice of change of address or to pay the fee of £4 demanded annually for retention on the Register. During the year 251 names were restored to the Register after compliance with the regulations. Of the total number of registered dentists not quite one-half, or 6824, are registered with medical, surgical, or dental qualifications, while the remaining 7564 are registered under the provisions of the Dentists Acts of 1878 and 1921. The total of dental students registered in 1928 was 256, the number of entries having increased slowly but steadily since 1925, but the number is obviously not yet sufficient to neutralise the wastage. The Dentists Register differs from the Medical Register in providing a local list of names so that it may be seen at a glance what dental practitioners are available in any English town or Scottish burgh.

THE LOCAL GOVERNMENT BILL.

A BRIEF account is given in our Parliamentary Intelligence columns of the important proceedings with which the Report stage of this Bill in the House of Lords closed on Thursday, March 14th, when the question which has aroused the principal discussion—namely, the inclusion of the word "treatment" in the functions of the advisory committees was temporarily settled adversely. In a final amendment to the related clause Lord Dawson moved to add to the bodies which local authorities ought to consult "the medical faculty of any university which serves the area, and the duly qualified medical practitioners in the area," and argued that it would be an obvious advantage that the representatives of the faculties of medicine who were concerned with the higher laboratory investigations and various forms of research should be able to join many representations by way of conference with the council. As regarded the question of the duly qualified medical practitioners in the area, it must be borne in mind, he said, that the doctors who up to now had given their advice—and very excellent advice for they were admirable in their own domain of preventive medicine—amounted to about 1700 in England and Wales, while the doctors who were concerned with curative medicine numbered something like 28,000. From this he argued that "when they were going to add to the duties of these councils by assigning curative functions to the hospital work, there should be some representatives of those people who spent their lives in dealing with disease and that it should not be left too exclusively as heretofore in the hands of the very excellent men whose knowledge and experience was limited to preventive medicine." Lord Onslow, however, considered that these points were met by including in the committees those medical men who were conversant with hospitals and deprecated the addition of medical men, however eminent, whose connexion might merely be that of interest in medical education. He thought also that only confusion would be caused by the addition to the advisory bodies of medical men not connected with the hospitals. It will be seen, therefore, that Lord Dawson's efforts to bring into proper relation with the new hospital administration the experience and life-work of the general practitioner have ended in failure for the time being, but his vigorous representations may yet play an effective part at the final stages.

A VALUABLE YEAR BOOK.

WE have received from Messrs. Charles Griffin and Co., Ltd., a copy of the Official Year Book of the Scientific and Learned Societies of Great Britain and Ireland for 1928, which contains a record of work done in science, literature, and art during the session 1927–28 by numerous societies and Government institutions. This is the forty-fifth annual volume of a useful compilation, and deserves a larger measure of support than appears to be forthcoming from the societies whose work is recorded. Next year it is proposed somewhat to limit the scope of the issue by inserting lists not of papers read but only those which are published by the societies in question, and so become permanently available for reference. We hope that the publishers will receive the support necessary to enable them to continue what is one of our most valuable and most accurate works of reference. The price of the volume, which is well printed and indexed, is 18s.

THE KING has appointed Dr. William Macrae Taylor to be Surgeon Apothecary to His Majesty's Household at the Palace of Holyroodhouse, in succession to the late Colonel D. J. Graham.

Dr. Charles Herbert Hampshire, F.I.C., has been appointed by the General Medical Council to be Secretary of the Pharmacopœia Commission, and will take up his duties from June 1st. Communications intended for the Commission should be addressed to the Secretary of that body at 44, Hallam-street, London, W.1.

ACCORDING to the Students' Register, issued by the General Medical Council, the number of medical students registered during 1928 was 1363—namely, 545 in England, 577 in Scotland, 241 in Ireland. The total number is a substantial increase over last year's total of 1214, larger than any entry since 1922, and approaching the pre-war average of the five years 1909–13—viz., 1420.

WE regret to announce the death of Dr. Lionel Sells on Saturday last at the age of 52. One of the group of men who early took up the study of X rays in this country, he served in the South African War as radiologist attached to the Royal Army Medical Corps, and later joined the medical service of Uganda where he investigated sleeping sickness. As a result of his radiological work he lost several fingers of each hand.

Sir StClair Thomson has been elected Correspondant Étranger de l'Académie de Médecine, Paris.

A CONGRESS AT ZÜRICH.—As we have already announced, the Royal Institute of Public Health will hold a congress at Zürich in Switzerland next Whitsuntide, from May 15th to 20th. The preliminary programme has now been issued, and shows that the Congress will meet in seven sections—namely (1) state medicine and municipal and social hygiene; (2) industrial hygiene and industrial diseases; (3) child welfare, school hygiene, and women and public health; (4) pathology, bacteriology, and biochemistry; (5) tuberculosis; (6) climatology and sports hygiene, and (7) veterinary medicine and meat hygiene. The social events include a reception by the authorities of the Canton and City of Zürich on May 15th, and a banquet on the 16th, and there will be an opportunity of visiting large numbers of institutions and centres of interest in the neighbourhood. A tour on the lake, and tours to Rheinfelden, the Rhine Falls, and Schaffhausen are among excursions for those attending the Congress, whilst extensions are also being arranged, by the Swiss Government and railways, enabling participants to pay visits at reduced rates to Lucerne, Montreux, Leysin, and Montana, to Davos, Arosa, Innsbruck, Oberammergan, and Munich, or to Czecho-Slovakia. The address of the Institute in London is 37, Russell-square, W.C. 1: the arrangements for travel and accommodation are in the hands of Sir Henry Lunn, Ltd., 5, Endsleigh-gardens, W.C. 1. It is hoped that any who are interested will apply for membership of the Congress.

The Clinical Interpretation of Aids to Diagnosis.

A Series of Special Articles contributed by Invitation.

XXVI.—ALBUMINURIA.

TESTING the urine for albumin is an essential part of clinical examination, and will always remain so. It is true that an albuminuria may prove to be of little significance, but on the other hand it may be the determining factor in the diagnosis and prognosis of some important diseases, and its discovery imposes on the practitioner of medicine the duty of seeking further evidence to decide this very point.

The albumin commonly found in urine is a coagulable protein identical with the serum albumin of the blood, but other proteins may also be present —globulin, nucleo-protein, and on rare occasions a peculiar proteose known as the "Bence-Jones protein." For this reason the term proteinuria tends to replace the older term in some quarters, but this is neither necessary nor justified, for common usage has given a meaning to the term albuminuria which cannot be mistaken—viz., the presence in urine of a protein in sufficient amount to be easily demonstrated by the heat coagulation test or by one of the precipitation tests.

Tests.

We do not want merely to know which is theoretically the best test, but rather to practise the simplest and cheapest tests which are adequate for the purpose and to understand their variations and fallacies. Protein can be demonstrated by coagulation reactions, precipitation reactions, and colour reactions, and there are literally hundreds of methods and reagents available for the purpose. Colour reactions cannot be applied directly to urine, so those in most common use are the heat and acetic acid test, Heller's cold nitric acid test, and precipitation by salicyl-sulphonic acid, trichloracetic acid, phosphotungstic acid, hydroferro-cyanic acid, or picric acid; and for globulin and nucleo-protein dilute acetic acid in the cold.

For ordinary practice the most satisfactory reagent is probably (1) *salicyl-sulphonic acid*. The substance is a non-corrosive white powder exceedingly soluble in water, keeps well in solution, and is easily carried about. In testing for protein a few drops of a saturated aqueous solution of the acid are added to urine in a test-tube, and if protein is present a white precipitate is formed, varying from a faint opalescence to a dense white curd according to the amount. It should be noted that urines do not give the test unless the reaction of the mixture of reagent and urine is acid, but obviously it is only in very few cases of exceptionally alkaline urines, such as results after taking large doses of alkali, that protein could possibly be missed. In such cases the difficulty is overcome by adding a few drops of acetic acid to the urine before adding the reagent.

For routine hospital work, and where it is desired to learn something of the nature of the proteins present, the urine should be always tested also by (2) the *heat and acetic acid test*, and by (3) the addition of 4–6 drops of 20 per cent. acetic acid without heating. The heat coagulation test is necessary for the detection of the Bence-Jones protein, which appears almost as soon as the test-tube is warmed (50–55° C.), and almost disappears on boiling. The dilute acetic acid in the cold test is necessary for the detection of globulin, which rarely may be present without much albumin, especially in my experience in asthma and allergic diseases, and appears slowly as a white cloud about five or six seconds after the addition of the acid. The quantitative estimation is rarely necessary, but if required, the well-known Esbach's method is sufficient.

It is usual to record the amount of albumin from the qualitative test in some such manner as this. (*a*) Faintest possible trace—an amount shown by a faint opalescence recognisable only when compared to a test-tube of untreated urine seen against a dark background. (*b*) Trace—an opalescence seen easily against a dark background. (*c*) Fair amount—a distinct curdy precipitate. (*d*) Large amount—a dense precipitate. A trace of albumin corresponds to less than ½-part per 1000, and a large amount to more than 5 parts per 1000 on the Esbach scale.

To summarise, testing for albumin is best done by putting the urine into four test-tubes. The first of these is left untreated, and used for comparison. The second is treated with 5 or 6 drops of salicyl-sulphonic acid solution, the third by heating and adding a few drops of acetic acid, the fourth by the addition of 5 or 6 drops of 20 per cent. acetic without heating. Comparison of these tubes will show the relative amounts of total protein, heat coagulable albumin, and globulin.

The Meaning of the Result.

It is now well recognised that in itself albuminuria is not necessarily a sign, or even a warning, of disease of the kidney. It may arise from the presence of pus, spermatozoa, or urethral secretion in the urine, but apart from these a group of causes may give rise to intermittent or temporary albuminuria which cannot be regarded as a sign of any disease. These "functional" or "physiological albuminurias" include a variety known as "orthostatic" or "adolescent albuminuria." A complete and satisfactory explanation has never been given for these forms, but they may result from exposure to excessive cold, from excessive exercise, from taking certain drugs, or from some unimportant constitutional factor in rapidly growing adolescents. H. H. Bashford has had an opportunity of examining a group of these cases after 20 to 30 years, and reports that they showed no greater liability to disease or sickness than the control groups who had no albuminuria in adolescence. He reports also that in about one-fifth of the cases the condition may persist into the third decade of life, and that the children of these subjects are likely to show the same symptom.

To assess the significance of albuminuria it is thus necessary to know: (*a*) the age and history of the patient; (*b*) something of the nature and amount of the protein in the urine; (*c*) whether the albuminuria is constant or intermittent; (*d*) if there are any other signs of kidney diseases, which in their order of importance are œdema, red cells in the urine, pyuria, impaired renal function tests and casts; (*e*) if general examination reveals any cause of the albuminuria, the chief of which are general arterio-sclerosis, acute infections, acute allergic disorders, heart diseases, liver diseases, chronic toxæmias from syphilis, tuberculosis, sepsis, and pregnancy.

Keeping these various points in mind it is possible to conduct an examination which would yield sufficient evidence to decide whether the albuminuria is (1) an innocent functional albuminuria, (2) due to kidney diseases, or (3) due to a general disease or toxæmia. In general terms it may be stated that when the protein is albumin or globulin, is intermittent and not constant, is not accompanied by the presence of blood cells, pus, casts, or œdema, and is not to be accounted for by obvious evidence of general disease or toxæmia, and the patient is under the age of 35, it is reasonable to presume that the albuminuria is a functional one of no importance.

Age and History of the Patient.—An albuminuria in apparently healthy new-born infants is common and of no importance, since it disappears after six or seven days. In later infancy and early childhood it is again common, but is then pathological and usually denotes either kidney disease or latent sepsis, especially congenital syphilis, tuberculosis, middle-ear disease, and skin sepsis. From later childhood to the age of 35 the various forms of functional albuminuria are common. After that age albuminuria is

probably always due to some pathological cause, but in practice, if it is the only sign of disease, it requires no drastic treatment.

The history of the patient may be helpful, but a short transient attack of acute nephritis or of scarlet fever five or ten years earlier must not be regarded too seriously, for an inflammatory lesion of the kidney lasting only a few days will have caused no permanent damage to the kidneys. I have followed cases who have had repeated attacks of hæmorrhagic nephritis for more than ten years without any apparent damage to the kidney, the urine remaining free from albumin and other signs in the intervals.

Nature and Amount of the Protein.—The rare occurrence of Bence-Jones protein or of globulin *without* any albumin can first be disposed of. If a Bence-Jones protein is present, the patient is likely to be suffering from a new growth of the bones with diffuse secondary deposits, probably of the nature of myeloma.

If globulin only is revealed by the acetic acid in the cold test and there is practically no albumin coagulable by heat, some transient condition, such as asthma or some form of functional albuminuria, is suggested. Further than this we cannot go, for when both albumin and globulin are definitely present there is no significance in the relative amounts of these two substances.

The amount of the albumin is of little help. Certainly, when only the faintest possible trace is found, it can be disregarded, and even as much as 5 to 10 parts per 1000 may be present in an entirely innocent case of functional albuminuria.

Constant or Intermittent Albuminuria.—It is o great importance to find out whether or not the albuminuria is constant in all specimens. A series of two-hourly specimens should be examined; when albumin is entirely absent during rest, and returns when the patient resumes the erect posture, it can be presumed to be functional. Confirmation of this can be sought by observation of the effect of a large dose of alkali or of calcium on the albuminuria. When the albuminuria disappears as a result of those measures, the patient is unlikely to be suffering from organic kidney disease.

Other Signs of Kidney Disease.—In all cases a careful and consistent search for red blood cells should be made, since these are the chief sign of inflammatory lesions in the kidney. In cases of parenchymatous tubular nephritis (nephrosis) there will be no hæmaturia, but œdema or a history of œdema will be found. On the other hand, an occasional hyaline or epithelial cast is not to be regarded too seriously, for they may be present without any kidney disease.

Renal function tests are not likely to be of great value in the doubtful cases, for it is in these very cases that the albuminuria will precede that degree of impairment of the renal function necessary to affect the efficiency of the kidney. But it is always wise to estimate the urea concentrating power of the kidneys and the blood-urea. If the urea concentration is below 1·8 per cent. and the blood-urea above 40 mg. per 100 c.cm. definite renal damage can be presumed.

General Examination.

Chief attention should be directed to the condition of the arteries, heart, and blood pressure. In patients with primary arterio-sclerosis and hypertension the presence or absence of albuminuria is one of the best guides to prognosis. So long as they remain free from albumin it is relatively good, but with the appearance of constant albuminuria the outlook is grave.

Albuminuria may result from so many febrile infections and general diseases that its significance under these circumstances is not likely to be mistaken. Its association with pregnancy is also well understood, and it is now widely realised that if it appears during pregnancy special antenatal care must be exercised and repeated examinations must be made in case it is a sign either of pre-eclamptic toxæmia or of nephritic toxæmia.

When so much has been claimed for latent focal infections as a cause of many obscure diseases, it is natural that these should have been suspected in cases of albuminuria where there is no other obvious explanation. It is certainly true that chronic bone infections, syphilis, and caseous tuberculous glands may so affect the kidney as to produce what might be called a toxæmic albuminuria. Probably there is some tubular degeneration of the kidneys in these cases, and if it is an albuminuria which is more or less constant in all specimens, it is rational to deal with any obvious focal infection. But always it must be remembered that if the patient is under 35, has no red cells in the urine, and appears to be otherwise in good health, the probability is that the albuminuria is an innocent functional affair. Every person passes albumin at some time or other, and at any given time it can be found in from 5 to 10 per cent. of whatever group of healthy individuals the observer may examine.

J. C. SPENCE, M.D. Durh., M.R.C.P. Lond.,
Hon. Assistant Physician, Royal Victoria Infirmary, Newcastle-on-Tyne.

Special Articles.

CLEMENS PIRQUET AND HIS WORK

AS DIRECTOR OF THE VIENNA UNIVERSITY KINDERKLINIK, 1911–1929.

BY the untimely death of Prof. Clemens Freiherr von Pirquet in Vienna on Feb. 28th the medical faculty of that University loses at once a distinguished professor and a rare personality. His death will also be mourned by a large circle of English and American friends and colleagues, for, even at that most cosmopolitan of Universities, Pirquet was remarkable for a catholicity of interests and sympathies which knew no barriers of race, religion, or nationality.

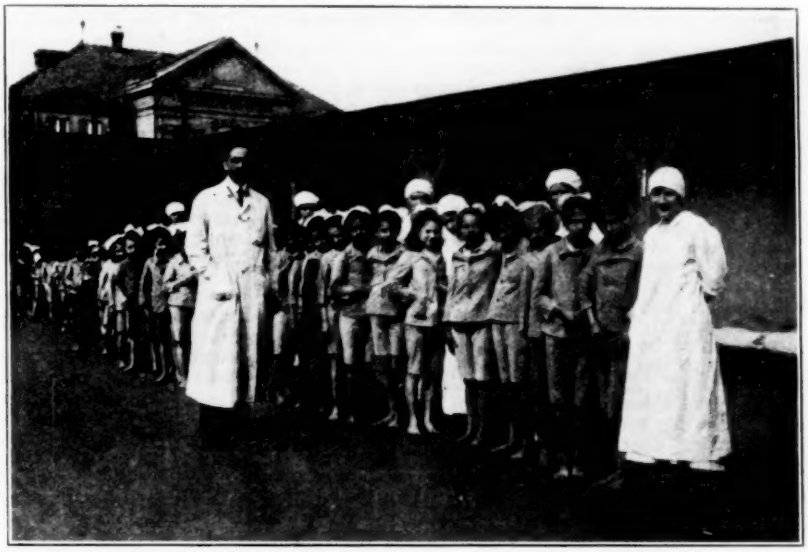
Clemens v. Pirquet, one of the younger sons of a Roman Catholic family belonging to the Austrian landed aristocracy, was born in 1874 at the village of Hirschstetten near Vienna, and was originally destined for the Church and educated for that purpose. This plan was, however, abandoned, and after studying at the Universities of Innsbruck, Vienna, and Graz he graduated in medicine at the latter University and shortly afterwards became assistant to Prof. Theodor Escherich, then Director of the Vienna Kinderklinik.

Pirquet's many important contributions to medicine, both as scientist, physician, and organiser, are especially notable for the originality and independence of thought they display. His early scientific work was devoted to bacteriology and immunity, more especially to the phenomenon to which he gave the name of Allergy, the condition in which an animal becomes supersensitive to foreign proteins, especially those derived from infecting microbes. To this period belong his important researches on serum sickness (Serumkrankheit) and on the immunological reactions following infection with tuberculosis, including the studies which led to the publication in 1907 of the skin test for the diagnosis of tuberculosis which bears his name. The analogous work with diphtheria carried out by his colleague and famous pupil Schick owes much to Pirquet's teaching and example. The reputation thus achieved was probably the cause of the invitation to the Chair of Pediatrics in Baltimore, which Pirquet accepted in 1908 and held for about 18 months. Then followed two years as Professor of Children's Diseases in Breslau, after which, in 1911, he was called to Vienna as Director of the University

Kinderklinik and successor to his old chief Theodor Escherich.

The magnificent Kinderklinik of the Vienna University was just completed when Pirquet took up his new duties there. In its present form it may be regarded as an expression of the genius of its first Director, not only in its material perfection but in the manifold nature of its activities and the spirit with which it is animated. It would be hard to find an institution where a real devotion to scientific research is combined so perfectly with an assidious care for the welfare and happiness of the sick children and with an affectionate consideration for the medical and nursing staff of every grade. It has been said that Pirquet transformed the ward maids into nursing sisters and these further into scientific colleagues. The vast series of investigations upon human nutrition which have occupied the attention of the Director and his assistants during recent years would have been impossible without the intelligent coöperation of his nursing staff. The results of his theoretical researches upon the nutritive requirements of the child at different ages and under differing conditions of sickness and health were applied conscientiously to the nutrition of every small patient. The hospital kitchen became the laboratory for this important work, and was one of the most impressive departments of the Klinik, never omitted when Prof. Pirquet conducted guests on a tour round the hospital. When asked how he succeeded in making his kitchen the instrument of scientific precision by which his "Nem" System could be applied, he would reply that the first step had been to place it in the charge of his most competent ward sister.

FIG. 2.

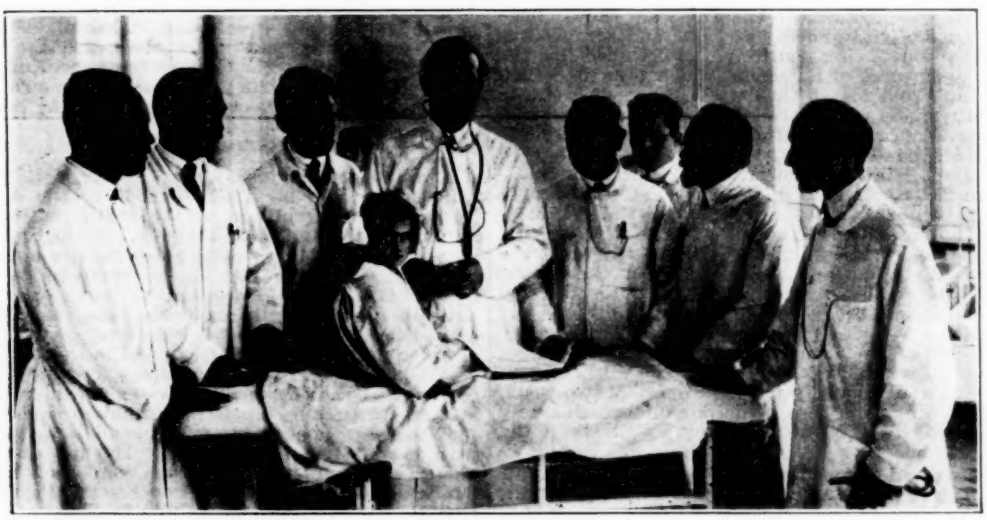


Prof. Pirquet with the children in the sanatorium on the roof of the Kinderklinik.

The "Nem" System.

Theoretical objections can be brought against Pirquet's "Nem" system, as for example, in the rejection of the calorie as a measure of nutritive value for a new arbitrary unit—viz., the "nem" or food value of 1 c.cm. milk (0·67 calorie). No one, however, who has seen the "Nem" system in working, can deny its success in practice. For in this system the nutritional value of foods is assessed against a *standard which can be seen and handled.* In the kitchen, where the nursing staff received an important part of their training, the working unit, 100 nems or 1

FIG. 1.



Prof. Pirquet and his assistants at the Vienna University Kinderklinik, 1920–22. (From left to right): E. Nobel (Vienna), K. Kassowitz (Milwaukee), H. Wimberger (Salzburg), Prof. Pirquet, B. Schick (New York), W. König (Vienna), E. Mayrhofer (Zagreb), R. Wagner (Vienna).

hectonem, is visualised as 100 c.cm. of milk, seen in the graduated cylinders which function as the ordinary kitchen measures. The newest probationer soon realises that the addition of 8 g. of sugar or cereal in in the preparation of an infant's food increases the food value of the meal by 50 per cent. The dishes destined for the older patients are prepared on similar quantitative lines, and the weighed portions served later in the wards secure that each receives a diet of the calorie value ordered by the physician, with the requisite proportions of fat, protein and carbohydrate.

The practical application of Pirquet's Nem system was fully developed by the end of the war period and was thus available for the time of suffering through which Vienna passed in the years from 1918 to 1922. When in 1919 the mass-feeding of the children was undertaken by the American nation, Pirquet was entrusted with the entire organisation of this gigantic enterprise, which involved the provision of at least one meal daily for 160,000 children of school age. In this work he was untiring, and his energy and hopefulness stood out in marked contrast to the spirit of despair and apathy which, at that period, brooded over the city. He was in truth, a "diffuser of life" in that time of trouble. Any morning, after discharging his duties at the Klinik, the Professor, accompanied by two of his assistants, might be seen hurrying to the headquarters of the "Amerikanische Hilfsaktion." His efficient organisation secured that the general scheme, conceived in the Kinderklinik, was faithfully carried out even in the most distant distributing centre. After a medical examination and assessment of their nutritional state by the series of body measurements laid down in Pirquet's System of Nutrition, the selected children received meals of suitable nem (calorie) value for their age. The kitchens, in some of which 10,000 meals were prepared daily, were run in accordance with the Nem system, directed by well-educated women trained in the kitchens of the Kinderklinik. The system employed is worth the careful study of all interested in school or communal feeding.

The Hospitality of the Kinderklinik.

The hospitality shown to foreign students in the Vienna Kinderklinik under Prof. Pirquet has become proverbial. A striking example is the welcome extended to the group of English women who, under the auspices of the Lister Institute and the Medical Research Council, went to Vienna for the purpose of studying deficiency diseases in the years following the war. Owing to their recent isolation, the Vienna scientists were ignorant of the new work showing the importance of vitamins in nutrition, and Pirquet was no exception, being entirely preoccupied in the quantitive aspect of nutrition, which presented such appalling problems at that time. Nevertheless, the British workers were warmly welcomed and received every assistance in their studies upon scurvy in infants and older children. Later, they were invited to undertake a joint experimental and clinical investigation on rickets and its relation to diet, this disease having become almost universal in the Viennese infants at that time. A complete ward, with nursing personnel and medical supervision, was placed at the disposal of the research, and, in addition, the scheme enjoyed the resources of the perfectly equipped X ray department and the devoted collaboration of the X ray specialist. At one time or another the help of every department of the Klinik and of almost every member of the staff was made available for the work. These privileges were freely given for the space of two years, and researches were thus made possible which surely could hardly have been carried out by guests in any other institution.

The love and devotion which Pirquet inspired in his staff, both medical and nursing, was touching. In his Klinik he was an adored king, yet no detail seemed too trivial for his personal attention, if it afforded an opportunity for some kindly act. He was very fond of children, and a favourite department of his Klinik was the large ward which he arranged on the roof for sanatorium treatment of 150 tuberculous children of all ages. The little patients would remain in this ward for periods extending to a year or more, and their life was arranged with due regard to their education and well-being in every direction. An attractive feature every morning was the long procession of children winding down the staircase from the roof, singing Austrian part songs on their way to the school, which was held in a special pavilion in the Klinik garden. Prof. Pirquet entered into the life and amusements of these children with perfect sympathy, and was often the central figure at their little festivities. At carnival time they, no less than the more fortunate children in the city, must have a party, and the Professor would often put on a fancy dress to add to the joy and gaiety of the gathering.

Prof. Pirquet was a tall handsome man and possessed great charm of manner. He was a fine linguist and spoke English perfectly and idiomatically. In spite of his success and enviable position he remained very simple in spirit and manner, and would display his pleasure at a birthday greeting from one of his small patients no less than when receiving some important honour or distinction from outside. Those who have enjoyed the hospitality of the Vienna Kinderklinik will find it difficult to visualise it without the gracious figure of its well-loved chief.

HARRIETTE CHICK.

BERLIN.

(FROM OUR OWN CORRESPONDENT.)

Anti-accident Week.

A SO-CALLED Anti-accident Week has just been held in Berlin. Lectures were given in schools, factories, and hospitals on the way to prevent accidents in industry, the home, and the street; special pains were taken with the instruction of children; and posters were seen everywhere in tramways, buses, railway carriages, public buildings, restaurants, and theatres, with advice on how to avoid accidents and on the need for effective first-aid. The cinemas contributed to the campaign by giving special performances. Figures published in the newspapers show that last year there were about 2 million accidents in Germany and that nearly 24,000 of these were fatal, giving an average daily mortality of 64. Thirty per cent. of them occurred in factories, the remainder being in streets and at home. The campaign was carried out under the patronage of the Ministry of Labour, the German Insurance Office, the employers' associations under the Workmen's Insurance Act (Berufsgenossenschaften), and the police.

Combating Noise.

The well-known aurist, Dr. Peyser, lately drew attention in the Medical Chamber to the noise in Berlin and its influence on the health both of the public at large and of individuals. He distinguished three kinds of noise: traffic noise, factory noise, and home noise. Continuous noise in factories leads, he said, to direct injury to the inner ear, whilst noise in traffic and in the home may cause serious disturbance to the nerves of sensitive persons. Most of it can, he thinks, be avoided, and in this connexion he alluded to the police regulations by which motor-cars have to give signals at every street-corner by horns, and to the signals of the fire brigade which consist of a continuous tintinnabulation, together with blasts on a special horn. The use of gramophones and loud-speakers at open windows is a recent but not less disagreeable nuisance. Dr. Peyser said that Berlin was the noisiest city in Europe, and on his suggestion the Chamber adopted a motion inviting the police to take measures against noise, especially in the neighbourhood of hospitals and sanatoriums.

Illuminated Door-plates.

To make it easier to find a doctor in urgent cases the door-plates of medical men in several towns have been lighted at night. This practice has not met with general approval, and in Berlin the Medical Chamber are of opinion that it is contrary to the recognised rules of the profession. They point out that in Berlin medical aid can be obtained in cases of accident through the municipal first-aid stations established throughout the city. In Hamburg a list of doctors prepared to do night service is kept by the police, and patients who want urgent aid have only to apply at the next police-station or approach a police-patrol which will at once fetch the next medical man on the list. It is reported that many of the junior medical men in Hamburg earn a livelihood in this way.

Sleeplessness in School-children.

Herr Klos, headmaster of a Berlin municipal school, says that about a third of the children at his school are still sleepy during the first morning lesson —many of them so sleepy that they cannot follow the lesson at all. On investigation he found that these children, although going to bed very early, are unable to sleep, and he has inquired into the causes of their sleeplessness. The answers were manifold: some complained of the noise of the wireless used by their parents, some of the noise made by neighbours doing night work. On the other hand, some said that the silence of the night made them nervous; they were afraid of burglars or ghosts. Some were disturbed by the light falling through the windows, or by barking dogs, others said that they were still thinking and ruminating upon school and other matters. A good many of the children were regarded as "obviously neurasthenic"; they complained that their bed coverings were too hot, that they had dreams, or that they were sweating and excited. Such cases ought to be examined by the school medical officer, whilst in the others there are external causes to be removed.

The Medical Profession and Trade Tax.

The Government has had the intention of including members of the medical profession among those who are obliged to pay trading tax. This intention has caused some alarm and the medical faculties of the German universities have petitioned against it, saying that in consequence of the measure doctors would be regarded by the public as tradesmen. The tax itself is fairly high but its direct financial effect would bear little proportion to the harm it would do. The Medical Chambers also have protested and it is reported that the plan has been dropped. It may be remarked that the provisions regarding medical practice are all to be found in the Trades Act of 1869, so that the Government's intention is not quite illogical. But the profession has long wanted to have medical practice taken out of the Trades Act and made subject to a special law, as is the practice of law and other liberal professions.

According to a report by Dr. Burgsdorf from the German Statistical Office the fertility of German mothers decreased by 26 per cent. between 1913 and 1926; the 1913 figure was itself 50 per cent. below that of 1875. In 1900 there were still 300 children born from each 1000 married women capable of child-bearing, but the annual figure fell to 138 in 1926. It cannot be expected that this state of things will change in the near future, and Burgsdorf thinks that the average of 3·4 children per married woman is insufficient to maintain the continuance of the German people without being supplemented by illegitimate births.

From an investigation by the German Health Office it appears that some of the cigars advertised and sold as not containing nicotine, or only a small and innocuous quantity of it, have proved to contain more nicotine than ordinary cigars. The advertisement of such cigars may thus be regarded as unfair competition and can be punished by law.

For the sake of rural school-children who often have to go a long way to the next dentist, the provincial school and health authorities of Rhenish Prussia have provided a motor-car fitted out as a dental dispensary. This motor-car contains an operating room with all the necessary dental appliances. The appliances are driven by electricity, the car containing a cable which may be connected with the nearest light cable. There is an appointed school dentist travelling with the car to the different places where the school-children are sent to him for dental examination and treatment.

UNITED STATES OF AMERICA.

(FROM AN OCCASIONAL CORRESPONDENT.)

Deaths of Physicians.

THE American Medical Association has issued its annual analysis of the information derived from obituary notices of its members. The average age at death is found to be 63·1 years, a slight gain on previous years. According to United States life-tables the expectation of life in this country at age 20 was 64·3 years in 1910 and 66·2 in 1922. It would be interesting to see a life-table constructed from the data obtained by the American Medical Association for the 2792 deaths that occurred among its members last year. Heart disease is the leading cause of death as might be expected, since it is overwhelmingly the most important cause in that part of the general community which survive the first two decades of life. It might at first sight seem strange or significant that tuberculosis should take as low a place as eighth on the list. However, if we consult a table showing for the registration States the chances, at a given age, of dying eventually from a given disease,[1] and select the age-group 15–25 (since all doctors must have reached that group before becoming doctors), it appears that here tuberculosis takes seventh place. Using this method of comparison it will be found that the causes of deaths among physicians are not greatly different in their relative importance from the causes of death among their patients.

Ventilation of School Buildings.

When the New York State Commission on ventilation reported six years ago that they had found less respiratory sickness among the children in window-ventilated schools than in the schools that were mechanically ventilated, a controversy was started that has scarcely died down yet. Many States have outlawed the simpler method in their building statutes—and naturally the engineers were not inclined to submit without protest to a decision that seemed to condemn all their efforts. They desired that future investigations should take physical standards (as temperature humidity and air environment) rather than absences of pupils attributed to "colds." However, the public health investigators have remained firm in their contention that the final criterion is the health of the school-child, though they agree to the desirability of measuring the physical conditions and correlating their measurements with the practical findings in health. Subsequent investigations, including one that is just reported by an engineer of the public health service,[2] have amply confirmed the conclusion that window ventilation is associated with a lower rate of respiratory sickness. It is, of course, admitted that what holds true for classrooms is not necessarily true for large halls. Yet there is evidently some factor present in window

[1] Amer. Jour. of Public Health, 1928, xviii., 880.

[2] Greenburg, L.: A Study of the Relationship between Type of Ventilation and Respiratory Illness in Certain Schools of New Haven, Conn. Public Health Reports, 1929, xliv, 285.

ventilation that is either unknown or whose value is not properly appreciated.

Mental Hygiene.

The first international congress of mental hygiene is to be held in Washington, D.C., during the week of May 5th–10th, 1930. The secretary of the American National Committee, Mr. Clifford W. Beers, has been elected secretary-general of the congress. An administration office has been opened at 370, Seventh-avenue, New York City, in charge of Mr. John R. Shillady. British members of the sponsoring committee are Dr. J. L. Birley, Sir Hubert Bond, Dr. A. Helen Boyle, Sir Farquhar Buzzard, The Countess of Chichester, Sir Maurice Craig, Lady (Horace) Darwin, Miss Evelyn Fox, Dr. Edwin Goodall, Dr. J. R. Lord, Dr. H. C. Marr, Dr. Bedford Pierce, Prof. George Robertson, Sir Leslie Scott, Lord Southborough, and Dr. Henry Yellowlees.

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

Sanatoriums and Tuberculosis.

AT the annual meeting of the Royal National Hospital for Consumption Prof. T. G. Moorhead took the opportunity of suggesting what place sanatoriums should take in the fight against tuberculosis. Recent pronouncements, he said, had led many to think that sanatoriums had become obsolete, but they were still the first line of defence. What had failed had not been the sanatoriums, but the provision of after-treatment. It had been estimated that there were in the Irish Free State 18,000 fewer sufferers from tuberculosis than in 1912, and in the accomplishment of that change sanatoriums had certainly played a part. There was still inadequate sanatorium accommodation. He urged the establishment of a tuberculosis colony in the Free State, but it should not be established in connexion with any single institution, but should be open to patients from all sanatoriums.

The Hospitals and Treatment for School-children.

For some time past negotiations have been going on between the city hospitals and the City Commissioners of Dublin regarding the treatment of school-children for disabilities discovered in the course of medical inspection. The Leinster Branch of the British Medical Association tried to secure unanimity among the staffs of the hospitals about the remuneration they would accept for specific services in the hospitals. Certain grouped hospitals have, however, agreed to conditions which do not meet with the approval of the Leinster Branch, and it is suggested that these terms have been agreed to without the authority of the members of the staffs of the hospitals. At a recent meeting of the branch a resolution was unanimously carried withholding approval of the arrangements on the grounds that the remuneration mentioned was quite inadequate for the services rendered, and that the correspondence submitted to it bore no evidence of the terms having been accepted by the medical staffs of the hospitals concerned.

A Medical Recruit to the Dáil.

Dr. Thomas F. O'Higgins has been elected deputy for the northern division of the city of Dublin by a narrow majority. His entry to the Dáil should add strength to the already important medical group of deputies. Both divisions of the city of Dublin now have a medical man among their representatives. Dr. O'Higgins is a son of the late Dr. T. F. Higgins, of Stradbally, Queen's County, and a brother of the late Mr. Kevin O'Higgins, Minister for Justice. He took his qualifications from the Royal Colleges of Physicians and Surgeons in 1914, and subsequently served for some years in the Royal Army Medical Corps. For the past few years he has been Director of the Army Medical Service of the Irish Free State. He has been a competent administrator, and it is well that while the public loses his services in one capacity it secures them in another.

MEDICAL RESEARCH COUNCIL.

ANNUAL REPORT FOR 1927–28.[1]

THE report for the year 1927–28 to the King in Council from the Committee of the Privy Council for Medical Research incorporates the fourteenth annual report of the Medical Research Council. The total sum at the disposal of the Council last year was £166,000, including the Parliamentary grant of £148,000 and an additional £18,000 from unofficial public and private sources. It is noteworthy that less than 6 per cent. of the total expenditure was spent on administration, that roughly one-third has been allocated to the maintenance of the National Institute for Medical Research and its associated laboratories, and that two-thirds has been paid out in salaries and grants for expenses to workers in other institutions.

Liaisons throughout the Empire.—During the year liaisons have been established or fostered between the Medical Research Council and other official research organisations in the Empire, notably by the visit of their secretary, Sir Walter Fletcher, to India, and by the coöperation of Prof. Lyle Cummins, of the Tuberculosis Committee of the Council, with the corresponding committee of the South African Institute for Medical Research. The National Research Council of Canada is keeping the Medical Research Council informed of the progress of large-scale experiments designed to test the value of the B.C.G. vaccine, and investigations carried out in the colonies, protectorates, and mandated territories is being brought effectively into relationship with those in progress in Great Britain by the work of a newly established Colonial Medical Research Committee. The Empire Marketing Board has coöperated with the Council in investigating the nutritive values of various foodstuffs and products.

It happens that this year the Medical Research Council are able to draw attention to several therapeutic innovations, certain of which are based on work done in their own laboratories or elsewhere under a grant from the funds at their disposal. The great service done by the Council in fostering medical progress is bearing fruit not only in the opening up of new avenues of approach, but in making available for general use the results of scientific investigation at the earliest possible moment, and in the critical examination of new methods of diagnosis and treatment. We summarise below some of their comments on methods of treatment.

COMMENTS ON INNOVATIONS IN TREATMENT.

Pernicious Anæmia.

Referring to the treatment of pernicious anæmia by the administration of liver, the Council note that Minot and Murphy made this discovery by directly applying in hospital practice the results of experiments made with dogs which Whipple and Robscheit-Robbins, of Rochester, N.Y., had just published. Here again, as in so many other instances, the experimental method has brought a practical advance where observational study through all the years had brought none. Here, too, is a fresh instance of service being given to mankind for which the dog was found to be especially fitted.

The coöperation of manufacturing firms was enlisted by the Council as soon as it was established that the unknown factor which effects the cure can be extracted on a commercial scale, and a simplification of the process used in America was worked out

[1] London: H.M. Stationery Office. 1929. Pp. 165. 3s.

at the Council's laboratories. As a result extracts of liver of proved potency are not on the market for patients who cannot tolerate a large daily consumption of uncooked liver as such.

Artificial Light.

Medical treatment by artificial ultra-violet light (as distinguished from sunlight) has lately come widely into use in this country with a rapidity not hitherto common even for the best attested therapeutic novelties. Great sums of private and public money are being expended upon it and large new commercial and professional interests are involved. The Council point out that some part of this new use of light has an indisputable scientific basis, but that prolonged researches give no scientific reason to suppose that the supply of vitamin D to the body for the treatment of rickets, or any other purpose, is better effected by ultra-violet rays falling on the skin than by the direct provision of the necessary food values. The use of artificial light to supply only what the right food can give is merely wasteful. It commonly costs three or four shillings to give by light an effective supply of vitamin D that would cost less than a penny if given by the mouth in the form of cod-liver oil or otherwise.

In order to ascertain whether ultra-violet light had any general beneficial effects, two series of controlled experiments were conducted on subnormal infants and on healthy school-children respectively by Dr. Helen Mackay and Dr. Dora Colebrook. In the first series (who were given cod-liver oil to eliminate the purely nutritive factor) no evidence could be found of any gain in weight, of lessened anæmia, or of better resistance to infective illnesses in the treated group as compared with a similar group of untreated children. The "control" group showed indeed rather fewer respiratory infections. In the second series, when conditions between the children with and without the treatment were equalised, the results of the light were wholly negative. It gave no gain in weight, height, or observed mentality or "spirits," and the incidence of minor ailments such as colds was actually rather higher among those receiving the light. The Council are aware of no properly controlled experiments which have been made elsewhere to set against these two series.

The only medical uses of "light" radiations, other than the supply of vitamin D, which have already a basis in physiology depend upon their power of exciting a local inflammatory reaction in the skin, on which power depends Finsen's method of treating lupus. Independently of this, work done in recent years for the Council has shown that light, when it has produced a much weaker inflammatory reaction of a larger area of the skin, indicated by an after-flush, does cause an increase in the power of the blood corpuscles, as tested in shed blood, to dispose of bacteria. But this increased bactericidal power of the blood, as shown in the laboratory, has not yet been correlated with any permanent effects of value in the body, and is quickly followed by a decrease of bactericidal power. Moreover exactly the same effects for good or evil follow inflammation of the skin blood-vessels inflicted by heat or by other irritants than light. There is no present reason to know that artificial light can do more in this way than a mustard plaster, which is indefinitely cheaper.

Dr. Duke-Elder, working at the Royal London Ophthalmic Hospital, has found, like some earlier observers, that direct "local phototherapy" notably hastens the healing of corneal ulcers. There is no equivalent evidence of successful local treatment of skin ulcers.[2] The results of a clinical inquiry recently organised by the British Medical Association on the treatment of varicose ulcers appear to put radiation high in the scale of effectiveness, but evidence is lacking that the high rate of recovery was due to the irradiation and not to the rest and bandaging which, at least in many cases, were concurrently applied.

The Light Committee of the Council have found no reason for weakened confidence in the claims made by a number of distinguished clinical observers for the value of carefully regulated exposure of patients to natural sunlight, especially in such conditions as surgical tuberculosis. However, it cannot be taken as established by scientific evidence that the sole, or even the principal, factor in the benefits obtained by such treatment is the relatively small ultra-violet component of natural radiation from the sun, or that similar benefits can be expected from treatment indoors with ultra-violet rays. In the absence of this evidence it seems fair to suspect that in much of the present advocacy of light treatment the results post hoc are accepted as propter hoc, and beyond that common fallacy there lie all the possibilities of faith-healing and suggestion, as well as those of simultaneous but unnoticed changes in the personal hygiene of those treated. It would seem to be the duty of those who take the responsibility of prescribing light treatment, not only to secure that its known dangers shall be avoided, but also to find and announce evidence of its benefits that do not come only from strong commercial advocacy on the one hand and popular credulity on the other. It would seem also to be the special duty of hospitals and school or other clinics expending large sums of public money upon artificial light to use part of the expenditure to demonstrate by properly controlled trials their justification for spending more.

[2] THE LANCET, 1928, i., 904.

Radium for Cancer.

In a brief review of the progress made during the period of about seven years since the Council was entrusted with 2·5 g. of radium by the Government the outlook has been transformed. In place of random empiricism definite technical methods have now been worked out for the treatment of cancer by radium for almost every region of the body except the stomach.

Modes of application have been devised and improved; problems of dosage in terms of mass of radium, its position, and time of exposure, have been successively brought nearer final solution. The rates of progress have been very widely different at the different hospital centres of work. But the Radiology Committee report that more recently effective effort is being made at "practically every centre," and this is taken as showing that there is now a widening circle of real interest in radium therapy among surgeons. This interest is coupled with the growing conviction that the full value of radium treatment "can only be discovered by exploring all the technical possibilities of radio-surgical access and of variations in dosage." It is already possible to say that any woman suffering from early cancer of the neck of the womb can have the disease locally removed by a course of radium treatment as surely as by the knife, and of course with less suffering and risk. Radium has already proved to be the best means of treating "inoperable" cancer of the mouth or tongue. Its use gives a prospect of cure certainly in excess of that offered by surgical means. In the "operable" cases it seems that it will soon replace excision, for it removes the growth locally without mutilation and with less scarring, and gives a good functional result. Even if the growth should have spread to the glands there is now a good prospect of radio-surgical methods eradicating the disease. Similar confidence is rapidly gaining ground in respect of cancer in other positions—for instance, in the breast in women and in the rectum in men. There is reason, moreover, to feel sure that this progress is only the beginning of an accelerating advance. The stage has been reached when the progress now securely made is undoubtedly stimulating interest and effort in a widening circle, and this will allow the best conditions for more rapid advance on an extended front.

As radium treatment has won its way from inoperable cases to the operable and earlier cases its successes have multiplied and the growth of faith in it has been both justified and accelerated.

If the advances in research work on its clinical side have been tardy here as compared with those over the same period in other countries such as Sweden or France, the reason may lie in the fact that abroad the work has been done at centres where the whole organisation on both its laboratory and its clinical sides has been so arranged as to keep progress by systematised and controlled trials as the prime object in view. For Great Britain the centres have been necessarily arranged chiefly within large voluntary hospitals, where skilled clinicians and pathologists are available together with organised accommodation for patients. The Council had little alternative to this without an expenditure upon a scale for which they

were not even approximately equipped. The great general hospitals, however, do not always offer in their traditions and in their arrangements, personal or material, the best conditions for systematic and rapid advance by research of a clinical kind. In individual hands and at some centres brilliant results have been achieved in recent months.

The public and the profession alike can now perceive that the stage has been fully reached when radium treatment must be put within the reach of all whose lives depend upon it. There is at present a wholly inadequate supply of radium in the country as well as a corresponding shortage of really trained operators and of available hospital beds. But since it will be long before finality in technique is reached, every treatment centre must be a research centre, and vice versa, and therefore in any sound national scheme of treatment most of the existing centres should be retained and expanded, and others established should be closely affiliated to the present centres.

Nephritis.

Prof. S. J. Cowell, then working under Prof. E. Mellanby at Sheffield, continued his researches during the year on the relation of diet to nephritis. He has found that vegetables, and especially summer-grown green vegetables, have a powerful protective influence against inflammatory changes in the kidneys and thereby prevent a high non-protein nitrogen accumulation in the blood. Experiments are being made to determine the exact nature of the protecting agent. Milk or cereal foods have no protecting action.

The work of Dr. A. A. Osman and Dr. H. G. Close at Guy's Hospital on the treatment of nephritis by alkalies has been maintained, and it is believed that in suitable cases this gives a much higher percentage of successful results than any other single form of treatment. Further evidence of the efficacy of alkalies in the treatment of anuria has been obtained, and some light has been thrown on the mode of action of alkalies in causing diuresis. The instability of the acid-base balance is found to be of importance in the causation of acute nephritis. Further experimental evidence has also been obtained that alkalies prevent scarlatinal nephritis.

Dental Disease.

Correlation of animal experiments with findings by Mrs. M. Mellanby goes far to suggest that the fundamental cause of the prevalence of dental caries is a defect of nutrition, and that it may be possible by dietetic measures to check the incidence of dental disease, even in the cases of defective original structure. With Dr. Lee Pattison Mrs. Mellanby has tested the effect of irradiated ergosterol on the initiation and spread of caries in children.

An important investigation has been begun at Birmingham by Mr. A. Deverall and Miss E. Brinton, where children in three institutions are receiving special additions to their ordinary diet with a view to determining the influence of these on the development of teeth and liability to caries. Miss Brinton has been responsible for the distribution of the special articles of diet, for noting any cases where owing to sickness or other cause the diet has been suspended, and for recording the family and personal history of each child, the physical condition (including the transference of notes from medical officers' records), and any personal idiosyncrasies.

Diabetes.

At King's College Hospital, London, Dr. R. D. Lawrence has discovered from recent experimental work that the usually accepted quantitative relationship between insulin and glucose does not exist. The normal ratio of dosage of insulin to carbohydrate used up is found not to hold beyond a certain point. Beyond this, relatively small increments of insulin can enable the body to dispose of increasingly large amounts of carbohydrate. With Dr. Olive Buckley he has investigated the factors, such as septic infections and toxins, which antagonise insulin action, and Dr. Buckley is investigating the eosinophilia which seems to be produced in many diabetics by the continuous injection of insulin. Dr. R. A. McCance has almost completed an analysis of carbohydrate foods which shows that the available carbohydrate of fruits and vegetables is less than has been supposed.

A request was received by the Council for the trial of a proprietary preparation named "Glukhorment." This was alleged to be a preparation from the pancreas containing a natural anti-diabetic principle which, unlike insulin, was effective if given by the mouth. Its use had been supported by Prof. von Noorden, of Frankfurt. Chemical examination by Dr. H. H. Dale and Dr. H. W. Dudley showed that "Glukhorment" contained enough of a substance indistinguishable from "Synthalin" to account for its recorded clinical effects. This finding has been confirmed by workers in Czecho-Slovakia and in Germany and by a clinical trial made by Dr. R. D. Lawrence.

Tuberculosis.

Dr. A. Stanley Griffith, working at the Field Laboratories, Cambridge, has given much of the past year to studies of the immunising value of the B.C.G. vaccine of Calmette and Guérin.

His work has not confirmed the conclusions that the ingestion or inoculation of B.C.G. can give complete protection in monkeys against an infection with virulent tubercle bacilli. With one exception all the vaccinated monkeys became infected and developed progressive tuberculosis. On the other hand, an absolute immunity has apparently been produced in a calf by intravenous inoculation of B.C.G. Experiments are now being made, with Prof. J. B. Buxton, to find the relative values of different methods of giving the vaccine, the most effective dosage, and the duration of the resulting immunity. The experiments completed show that immunity can be produced by intravenous, subcutaneous, or oral administration. Two calves fed by the last method have resisted completely the intravenous inoculation of 1 mg. of virulent bovine bacilli, which would have killed them without it in less than 20 days.

Dr. R. L. Vollum has continued his work on experimental tuberculosis with Prof. G. Dreyer at Oxford. This has been chiefly concerned with vaccination by different methods and after different cultural conditions of growth of the bacilli, followed by estimation of the resulting immunity.

Prof. C. H. Browning has tried to repeat observations by Danish workers on the treatment of tuberculosis by means of injections of metallic salts. Long series of injections of aluminium and manganese chloride were given with a wide range of dosage. So far little influence from the treatment has been observed. In tests with Rupell's serum in tuberculous mice no definite differences could be established between treated animals and untreated controls as regards the character and extent of the lesions or the number of tubercle bacilli present.

Puerperal Fever.

In the attempt to find prophylactic measures against puerperal fever the Council have promoted an extension on a large scale of the investigation Dr. H. Burt-White made in applying the Dick test to women before labour.

It had been shown by Dr. G. H. Eagles and others that a toxin similar to that which reacts in the Dick test for scarlet fever is found in many non-scarlatinal strains, including streptococci from puerperal fever. Dr. Burt-White has found that in a hundred prospective mothers admitted to St. Bartholomew's Hospital and to the City of London Maternity Hospital there was a close correlation between a Dick-positive result and subsequent puerperal sepsis. The correlation suggested so strongly the possibility and wisdom of rendering Dick-positive subjects immune to puerperal fever before labour that arrangements have been made for a thousand cases to be investigated by Dr. B. Jervis at the City of London Lying-in Hospital and Dr. G. Morgan at Queen Charlotte's Hospital, under the supervision of Dr. Burt-White and Dr. L. Colebrook. It is anticipated that a means of prophylaxis may be made available to antenatal cases who are shown by the Dick test to be susceptible to puerperal fever.

In the inoculation department at St. Mary's Hospital, London, Dr. Leonard Colebrook has completed one phase of his investigation of arsenical compounds in relation to the chemotherapy of streptococcus infec-

tions. It remains now to ascertain, by careful clinical trial, how much the streptocidal potency acquired by a patient's blood under the influence of these compounds will contribute towards the prevention and cure of streptococcus infections. These clinical trials have been begun and experimental work is also in progress. The drug used in these trials is a methylene bisulphite compound derived from salvarsan.

Canine Distemper.

Dr. P. P. Laidlaw and Mr. G. W. Dunkin have continued their work to a point when the knowledge acquired is capable of being usefully applied in practice to rendering dogs resistant to infection by distemper. In trials of the method upon over 1000 dogs kept under ordinary conditions, wherever a clear comparison has been possible between inoculated and uninoculated dogs the results have been strikingly successful, and evidence is lacking only as to the duration of the immunity conferred.

At the Tiverton Hunt 62 hounds were inoculated. None had distemper. The disease broke out among the older hounds in the same kennels in December, 1927, but no vaccinated animals took the infection. Four vaccinated animals were sent to a neighbouring kennel where distemper was present, but remained well.

In the Dulverton pack 5 out of 16 young hounds were inoculated, were exposed to infection, but remained well. Of the other 11, 9 took the disease and 3 died. Of hounds belonging to the Puckeridge pack 24 were inoculated. They were exposed to distemper and one contracted a mild form of the disease. Among the uninoculated hounds in the same kennels 70 took distemper and 22 died. In the Warwickshire pack 44 vaccinated hounds were exposed to infection without any taking the disease; 91 unvaccinated hounds kept together with these took distemper, 49 dying.

Apart from foxhounds, about 300 dogs of a variety of breeds have been vaccinated; none has been reported as contracting distemper.

The present method of immunisation is subject to some disadvantages, both as regards manufacture and administration. Further research, for a limited period, is therefore contemplated with a view to possible improvement in these respects. In the meantime, however, it is hoped that the benefits of the work already done will shortly be brought to the dog-owning public in general, and the Council are glad to learn that a commercial laboratory is now actively working towards large-scale production of the vaccine.

Sundry Other Disorders.

Gastro-duodenal Ulceration.—Further work on the intensive alkaline treatment of this condition has convinced Prof. H. MacLean and his colleagues at St. Thomas's Hospital Medical Unit that the method will cure the ordinary case of ulceration, and that surgical interference is entirely unnecessary in uncomplicated ulcers. Patients with adhesions and other complications may fail to respond, but evidence has been obtained which suggests that even cases with adhesions to sundry organs may do quite well. Although over 100 patients were treated during the last year only two required operation; in both cases extensive adhesions were found. The use of sufficient alkali, on the lines described in the published papers, has given excellent results and has enabled most of the patients to continue at work without the usual severe recurrence of symptoms.

Acute Intestinal Obstruction and Peritonitis.—In the Surgical Unit of St. Thomas's Hospital Mr. B. W. Williams has continued work on the clinical investigation of the use of antigas-gangrene sera in these cases with special reference to the efficiency of concentrated globulins. The concentrated serum has been found apparently efficient in counteracting toxæmia in 15 cases, doses of 20 c.cm. being apparently equal to doses of 100 c.cm. of the unconcentrated serum.

Trypanosome Infections.—The trial in experimental trypanosome infections of chemo-therapeutic agents belonging to the amino-styryl-quinoline group has been continued by Prof. C. H. Browning and Dr. R. Gulbransen. It is hoped that one of these may soon be available for testing in natural infections of larger animals. The problem of the treatment of relapses in trypanosome infections has been pursued further in the light of observations that killed parasites do not by themselves give rise to an effective immunity reaction.

At Cambridge Miss M. Vincent and Dr. P. Tate, under the direction of Dr. D. Keilin, are testing the antimalarial effects of various synthetic compounds upon the malarian parasite of canaries.

Oxygen Want.—At Leeds Dr. H. W. Davies, using a simplified form of the Davies-Gilchrist oxygen administration apparatus, has made experiments to determine the effects of subcutaneous and intraperitoneal injections of oxygen upon the oxygen saturation of the arterial blood in conditions of oxygen want. No increase of oxygen saturation could be found, and it is inferred that injection of oxygen cannot relieve oxygen want in human patients.

Graves's Disease.—The relation of Graves's disease to iodine metabolism has been studied by Dr. G. S. Williamson and Dr. I. H. Pearse and colloid secretion has been shown not to be responsible for the toxic factor in this disturbance. Moreover, the danger of thyroxin and iodine therapy in the treatment of simple goitre has become more apparent by studies which have shown that lymphogenic secretion in the thyroid can be stimulated, and toxicity in the gland aggravated or induced by iodine, thyroxin, or thyroid-gland treatment. In individuals of hypothyroid disposition the danger of inducing a permanent lymphocythæmia by these therapeutic measures has become apparent.

Cardiovascular Diseases.—At Manchester Dr. J. Crighton Bramwell and Dr. R. Ellis are studying after-histories of patients suffering from different types of cardio-vascular disease. One group, for instance, consists of 27 cases of auricular fibrillation treated with quinidine for from two to five years.

Amœbiasis.—With Dr. P. P. Laidlaw and Miss A. Bishop, Mr. C. Dobell has maintained the studies already reported upon the value and uses of emetine for destroying the amœba in the human body. Under defined experimental conditions they find that as little as one part of this alkaloid in five million parts of culture medium will kill the amœbæ in vitro. A much improved method has been devised for testing the toxicity of chemical agents upon cultures of the amœbæ.

Epilepsy.—The previous findings of Dr. W. R. Brain, Dr. H. D. Kay, and Dr. S. H. G. Robinson, in the Medical Unit of the London Hospital, that alterations in the level of the blood cholesterol are associated with the fits in epilepitc patients have been confirmed. The oral administration of cholesterol to epileptics has been tried and found to have no therapeutic value, but the evidence that it is absorbed by this route is unconvincing.

Familial icterus neonatorum has been investigated and treated by Dr. A. C. Hampson at Guy's Hospital. Up to the present time 14 cases have been treated with serum—all successfully.

Enteric Carriers.—The investigation under Prof. R. Muir and Prof. C. H. Browning has been continued by Dr. K. Guthrie. Of two intestinal excreters operated on by Mr. Farquhar Macrae the one infected with *B. typhosus* has now consistently failed to show the organism in weekly examinations over a period of five years; the other, infected with *B. paratyphosus* B, has similarly given negative results over a period of three years. Cultures made from the duodenal contents in both cases failed to yield any growth of the specific organisms. These results provide confirmation of the efficacy of operation on the gall-bladder, usually cholecystectomy, in curing the carrier condition in a large proportion of cases.

CANCER AND TUBERCULOSIS:

THE SUPPOSED ANTAGONISM.

THE publication by Prof. Raymond Pearl of a paper entitled Cancer and Tuberculosis in the *American Journal of Hygiene* for January raises once more the question of an antagonism between these diseases. Although a great deal has been written about it, no quite conclusive answer has been given to what seems a simple statistical question. Prof. Pearl has tackled the problem in two ways. An analysis of the admirable autopsy records of the Johns Hopkins Hospital forms the groundwork of his paper, while subsidiary evidence from vital statistical data is also brought forward.

A series of 816 records of persons in whom some form of malignancy was discovered at autopsy was compared with an equally large sample in which there were no signs of new growth. The control group was selected in such a way that each member of the series agreed with one of the malignant series in respect of age, sex, colour and, as far as possible, date of death. From these data the incidence of active and healed tuberculous lesions in the two groups was calculated, and the conclusion is reached that there is a definite incompatibility between malignant disease and tuberculosis, such that the two very rarely occur together in florid activity in the same person. Taking the whole series, only 6·6 per cent. of those with malignant growths showed signs of active tuberculosis, whereas in the controls active lesions were found in 16·3 per cent. This difference between the two groups was found to apply equally when each age, sex, and racial group was subjected to separate analysis. Healed tuberculous lesions, on the other hand, were no less frequent in the malignant than in the control groups.

The problem was then approached from the opposite point of view, and the incidence of malignancy in a series of persons with tuberculosis in any degree of activity was compared with its incidence in a control series either without tuberculosis or with only old healed lesions. Among the actively tuberculous the incidence (28 per cent.) was found to be approximately only half as great as in the controls (53 per cent.). In making the comparison any case with tuberculous lesions which showed even the smallest evidence of activity was relegated to the group "active tuberculosis." This procedure would tend to obscure the inhibitory effect (if any) of active tuberculosis on the development of new growth, and if a series of post-mortem cases in which there was a great deal of active tuberculosis (e.g., acute ulcerative tuberculosis, tuberculous meningitis, vertebral caries) is compared with an adequate control series the difference in incidence should be relatively greater. This proved to be so, for of 886 persons with much active tuberculosis only 11 (1·2 per cent.) showed signs of malignant tumour, whereas in 886 persons of the same age, sex, and racial constitution 82 cases (9·3 per cent.) of malignancy were found. This general result again holds good for each separate age, sex, and colour group.

Malignancy in the control group was thus nearly eight times as frequent as in the series with a great deal of active tuberculosis, whereas when tuberculosis of any degree of activity was compared with controls the incidence in the latter was only twice as frequent. This suggests that there is a simple quantitative relation—that in the inhibition of malignancy it is not only the *presence* but also the *amount* of active tuberculosis which is important, and that the antagonism between the two diseases disappears when the tuberculous process heals or retrogresses.

With such clear autopsy results, it might be anticipated that official mortality statistics would provide valuable confirmatory evidence, and in a sense this is true. Prof. Pearl points, for example, to the higher tuberculosis and the lower cancer mortality in the male sex, the different ages of maximal incidence of the two diseases—tuberculosis being chiefly a disease of early, cancer predominantly one of later life—and the higher tuberculosis and lower cancer mortality in coloured compared with white races. The recorded secular trends and the incidence of the two diseases in the various organs of the body are not inconsistent with the view that antagonism does exist, but are insufficient in themselves to demonstrate causal connexion. More refined analysis of available mortality records only serves to emphasise the need for caution in the interpretation of statistical data. In a series of 22 States of U.S.A. the correlation between mortality from pulmonary tuberculosis at one decade of age in 1910 and that of cancer at the next higher decade in 1920 was determined. Contrary at first sight to what would be expected from the results of autopsy analysis, the correlations are all substantial in magnitude but *positive* in sign, indicating higher cancer mortality in areas with high tuberculosis rates. If mortality is a reasonable index of morbidity incidence this might be interpreted in such a manner that autopsy and official mortality returns would appear to be hopelessly at variance. But Prof. Pearl, rightly more impressed by the autopsy findings, offers an alternative explanation, equally plausible and reconciling otherwise discrepant results. Autopsy data indicate that active tuberculosis alone protects the organism against cancer. If, under prevailing environmental conditions, only a limited number of persons will ever develop florid active tuberculosis, and if the mortality from this cause is very high at any given age, the number left to develop active tuberculosis at later ages will be smaller than if the death-rate previously had been low. Consequently, if antagonism between the two diseases does exist, relatively more persons from a given age-group will reach a later age lacking the protection from cancer afforded by active tuberculosis, and a high cancer mortality combined with high antecedent tuberculosis mortality would result in such a community. Prof. Pearl realises that this is mere hypothesis, and conservatively concludes that official vital statistics present nothing contradictory to the conclusions reached from the more exact autopsy material.

This is probably the most thorough investigation of the problem which has yet been made. It is being followed up by experimental and clinical work, the results of which will be awaited with great interest.

DEATHS IN LONDON STREETS.—Deaths in street accidents in the London area during 1928 numbered 1237, being 181 more than in 1927. In the last quarter of the year the total was 365, or four deaths a day. In 1920 the number of persons killed was 638, in 1925 840, and in 1927 1056. Private motor-cars caused 120 deaths and 11,623 accidents to persons and property, trade and commercial mechanically propelled vehicles 101 deaths and 7318 accidents to persons and property. Of the 365 persons killed, 258 were pedestrians, of whom 126 are recorded to have "crossed the road without due care." The total of drivers and occupants of vehicles who lost lives was 22.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—The Fellowship announces that there will be no special courses until after Easter. The first course in April will begin on the 11th and will be a practitioner's course in medicine and surgery at the London Temperance Hospital, lasting two weeks, with daily sessions from 4·0 to 5·30 P.M. The London School of Tropical Medicine has arranged a series of eight clinical demonstrations to take place at 2 P.M. on Tuesdays and Thursdays, from April 9th to May 2nd. A course on treatment by electrotherapy will be given at the Royal Free Hospital on four successive Wednesdays at 5.15 P.M. from May 10th (entries limited to 16). Two courses will begin on April 15th, the first a course at the Royal Waterloo Hospital, in medicine, surgery, and gynæcology, occupying every afternoon, and some mornings, for three weeks, and the second, in neurology, at the West End Hospital for Nervous Diseases, every afternoon at 5 P.M., for four weeks (minimum entry 10). Syllabuses of all courses may be had from the secretary of the Fellowship at 1, Wimpole-street, London, W. 1.

Correspondence.

"Audi alteram partem."

CEREBRAL SURGERY.

To the Editor of THE LANCET.

SIR,—The leading article on cerebral surgery in your issue of Feb. 16th, inspired by Mr. Hugh Cairns's very interesting report on his experiences in Dr. Harvey Cushing's clinic in Boston, must have left a painful and misleading impression on the minds of your readers in regard to neurology in general and neurological surgery in particular as practised in Great Britain. It is my object, if possible, to remove this impression which, it is only fair to emphasise, is not confirmed by a careful perusal of Mr. Cairns's paper.

It is doubtful, for instance, if Mr. Cairns really intended the writer of your leading article to believe that the examination of the fundus oculi, the investigation of the visual fields, and X ray examinations are either "amongst the more recent advances in diagnostic methods" in cerebral tumours, or that they originated in America. Surely they have formed a part of the routine examination of every case in this country for many years past. Ventriculography, on the other hand, is still on its trial and its employment must always add to the sufferings, if not to the dangers, to which the patient is exposed. A false idea of its value may easily be conceived in the absence of adequate experience and skill in the interpretation of symptoms and physical signs. That this is sometimes the case is shown by a quotation from Mr. Cairns's report: "In 1925 Grant published a report of the pooled experiences of the American Society of Neuro-Surgeons. Ventriculography had been used in 392 cases and was held solely responsible for localisation of the tumours in 93 cases, or 30 per cent. of the verified tumours."

As a physician, it would be presumptuous for me to speak too positively, but I should be surprised if my surgical colleagues "read with special interest Mr. Cairns's account of the principles which underlie Cushing's surgical methods—namely, (1) avoiding injury to the brain, (2) haemostasis, and (3) asepsis and closure of the wound." It would surprise me less if they dubbed such a statement a surgical platitude. But world-wide principles in surgical methods are not infallible, and we learn from Mr. Cairns that "one of the earliest and most frequent complications after operation is the formation of a blood clot between the dura and the overlying bone of the osteoplastic flap. The clot compresses the brain and may be fatal if not discovered quickly."

It has for long been obvious to British neurological surgeons and physicians that a low mortality-rate depends chiefly on two factors: (1) early diagnosis, and (2) the non-gliomatous nature of the tumour. In your leading article appears the remarkable statement: "A low operation mortality-rate justifies early cerebral exploration and so leads to the removal of tumours at an earlier stage of their development than has hitherto been possible"—a unique example of putting the cart before the horse. It is an early diagnosis which justifies early cerebral exploration, with removal of a tumour when it is removable, and so renders possible a low mortality-rate. Moreover, alleviation of suffering and disability, where radical cure is impossible owing to the gliomatous nature of the tumour, is more easily attainable when the diagnosis is made before headache, vomiting, and optic neuritis have become severe, and a high intracranial pressure has increased the dangers of operating. It is a pity that more attention is not drawn, either in Mr. Cairns's paper or in your leading article, to the absence or tardy development of headache and papilloedema in many cases of intracranial growth which are the most amenable to surgical intervention and which are not beyond the powers of neurologists to detect and locate.

My personal acquaintance, during the last 30 years, with the work of Sir Victor Horsley and his disciples prevents my subscribing to the statement that "for many years technique has lagged behind diagnosis in neurological surgery," and I am not satisfied that the results they have obtained have been inferior to those reported from the Boston clinic by Mr. Cairns. The latter's report naturally contains little indication of permanent results in relation to functional efficiency and the statistics he publishes in regard to operative mortality are of little importance for purposes of comparison, in view of the fact that they are based on a series of cases of which nearly 40 per cent. were of pituitary or acoustic nerve origin. It is not fair to Dr. Cushing, therefore, that the writer of your leading article should hail them in these words: "These remarkable figures, which it is safe to say have never been equalled elsewhere, will excite not only admiration but a demand to know how they are achieved."

May I submit very respectfully that surgical technique must always have an individual and personal flavour, and that two surgeons practising with the same principles but entirely different details of technique may attain equally successful results. Dr. Cushing's work has always commanded the deepest respect of his many friends and admirers in this country and he does not need to be told that every detail of his technique is studied with care and interest. While agreeing that "it is well at times to recognise that there are forms of mutual indebtedness between nations which excite no feelings but gratitude," I can hardly believe Dr. Cushing would express his belief in his own methods and his regard for his English colleagues in language such as this: "It is clearly to the patient's interest that Cushing's methods should be practised as widely as possible, though it must not be supposed that English neurology has nothing to contribute to neurological surgery"!

I am, Sir, yours faithfully,

Oxford, March 18th, 1929. E. FARQUHAR BUZZARD.

OPERATING FOR APPENDICITIS.

To the Editor of THE LANCET.

SIR,—Regarding an objection to the delayed system of treating certain cases of appendicitis—viz., that the patient having passed the crisis fails to submit himself for appendicectomy, for three years I have worked on the following plan. As soon as it is evident that resolution of the disease may be confidently expected the patient is handed two cards to sign. On each is printed:—

"I realise that I have just been tided over an attack of appendicitis. The surgeon considered that in my case it was safer to defer operation. I fully understand the danger of leaving the appendix, and I agree (1) to come into hospital on.....; (2) to report at the hospital immediately if I have any symptoms before that date

"Signed, ——————."

Before this plan was adopted I found that more than 5 per cent. of the patients who had successfully undergone Ochsner's treatment failed to return. They were written to and a proportion replied with various excuses, the principal being that they had not fully understood the advice. Since the plan has been in operation, in only two instances has the patient neglected to keep the agreed appointment. Two cards are signed: one the patient takes away, the other is indexed and serves to remind the staff of the appointment, which, except in special cases, is made for a date two months after leaving. Experience shows that in the average case an interval of two months is necessary for the products of inflammation to resolve completely. In exceptional cases three months is necessary as Mr. Love emphasises.

I am, Sir, yours faithfully,

HAMILTON BAILEY.

Edgbaston, Birmingham, March 17th, 1929.

GAMMA RADIATION.

To the Editor of THE LANCET.

SIR,—The note by Mr. Wakeley and Dr. Colwell on the radium treatment of cancer of the rectum in your last issue conveys the impression that the treatment described by them is entitled to the heading "gamma radiation." The authors emphasise "gamma radiation" not only in the title of the note but in stating: "It is clear from the filtration that the neoplasms were subjected only to gamma radiation." After careful perusal of the article we think that the method described hardly comes under the heading of "gamma radiation." The tubes used contained 50 mg. of radium sulphate; the length of the tubes is not stated, but screened by 1 mm. of platinum and rubber tubing they will only give pure gamma irradiation if their linear intensity is about 1 mg. of radium per cm. length. In that case the containers would have to be about 50 cm. in length, an impossible proposition.

We presume that the length of the torpedo-shaped containers was commensurate with the length of the growth attacked, perhaps 4 or 5 cm. The linear intensity of such tubes screened as described is such that pure gamma radiation is out of the question, unless placed at a considerable distance (10 cm. or more) from the growth which is impossible when applied within the lumen of the rectum. Radium therapy as practised by Mr. Wakeley and Dr. Colwell has produced necrosis in a large number of cases, owing to a combination of beta and gamma radiation. This can be achieved much more rapidly and with less expense by diathermy.

At the present time, when much public attention is focused on the possibilities of radium treatment of cancer, it seems to us that the note by Mr. Wakeley and Dr. Colwell is calculated to mislead some workers in the field who may not be aware that gamma therapy acts by dissolution and absorption rather than by destruction through necrosis (beta radiation), which causes great suffering to the patient. Gamma irradiation given with efficiently screened tubes of suitable intensity over prolonged periods of time produces no ill-effects and does not lead to necrosis, although it is not claimed that it is always curative.

Clinical experience leads us to believe that the importance of adequate screening is not always sufficiently appreciated and further, we believe that heavier screenage than is usually employed with needles at the present time will result in improvement in clinical results, and this is our excuse for criticism on this occasion.

We are, Sir, yours faithfully,

C. GORDON-WATSON,
STANFORD CADE.

London, W., March 16th, 1929.

GLASS-WORKERS' CATARACT.

To the Editor of THE LANCET.

SIR,—Your annotation of March 9th (p. 513) gives an incorrect account of the discovery of glassworkers' cataract in this country. I was the first to describe the peculiar features of this disease in the *British Medical Journal* of Jan. 24th, 1903. It was my paper that directed Sir Thomas Legge's attention to the subject as he afterwards told me; and it was I who first showed the small Home Office committee consisting of Dr. G. J. Burch, Mr. Marcus Gunn, Mr. W. Anderson (all of whom are now dead), Mr. (now Sir) Herbert Parsons, and Dr. Legge the first 10 cases of the disease they had ever seen. These I demonstrated to them in the Sunderland Eye Infirmary. The circumstances were set out in a paper read before the Oxford Ophthalmological Congress in July, 1915, and published in *The Ophthalmoscope* for November, 1915.

I am, Sir, yours faithfully,

WM. ROBINSON.

Sunderland, March 10th, 1929.

THE INJECTION TREATMENT OF VARICOSE VEINS.

To the Editor of THE LANCET.

SIR,—If I write you again on the subject it is chiefly that I may make brief reference to the courteous letter of Sir Sidney Alexander, with whom I think I had some private correspondence on the subject a year or two ago, and who, as one of the earlier exponents of the injection method, and, so far as I know, one of the most temperate of its advocates, is entitled to have due weight given to the views he may express thereupon.

Sir Sidney quotes at some length from an appreciative letter, testifying to the great benefit derived by one of his patients from the injection treatment, after extensive operative treatment by excision and ligation had failed to cure. Though I might point out that the testimony of the patient seems to have been given too soon after the injection treatment (1926), and there is no later testimony as to the permanency of the benefit, I would not seek to labour unnecessarily this defect in the proof. Even accepting the case, however, at the value at which Sir Sidney assesses it, I might suggest that, if the injection treatment can ever be justified, probably this was the type of case that might most reasonably be submitted to it; a case, that is to say, where the extensive previous operations had presumably shut off most, if not all, of the avenues for systemic dissemination of clot. In other words, Sir Sidney carried out the injection treatment under conditions in which the risk of embolism had been very substantially lessened. If I were inclined to admit the justification of the injection method under any circumstances whatever, I should probably find the justification in such circumstances as were present in this case.

One further reference to Sir Sidney's letter. He points out that I seem to think "that a large number of cases of varicose veins do not require treatment." That is correct, but surely such a view is common to all. I might even assume that Sir Sidney shares this opinion. We may differ in view as to the relative proportion of cases that require treatment, but surely no one has reached the position yet where one might say, "Hello! Here is a varicose vein; let's inject it." Further, I must insist on the undesirability of meddling with the "odd superficial vein causing no trouble whatever, but perhaps showing as a bluish streak, &c." The type of vein to which I have referred is, in the great majority of cases, not a varicose vein at all; nor has it any very great tendency to become varicose. Such visible, but in no way disfiguring, superficial venules are to be seen in a very large proportion of women, and even in men, and they generally give no trouble—unless to the vanity of the flapper. It is surely not our duty to pander to this vanity.

May I take this further opportunity of restating the chief points in my case against the injection method? It seems necessary to get back to fundamentals—to general principles. In my official capacity I have the duty of teaching the student of surgery, and I am bound to teach him what I believe to be basic principles—principles, that is to say, which have a certain fixity or stability, though varying deductions may be made from them by different people. I endeavour to approach the subject of the injection method of treatment from this standpoint, and I would state my case against the injection method in the form of four questions.

First, is thrombosis, or is it not, a thing that the surgeon is justified in deliberately inducing under any circumstances?

Second, does the thrombus induced in the injection method differ, in any real essential that may be relied upon from the thrombus we so much dread as an accidental happening in surgery?

Third, are we able, as surgeons, to say with confidence that it will behave differently?

Fourth, can we confidently assure our patients that there is no risk attached to the injection method of treatment?

And, remember, it is the patient who has to take the risk.

I am bound to say that up to the present I have been unable to answer any of these questions except in the negative, and accordingly I am quite unable to commend to my students the injection method of treatment of varicose veins, nor would I like to appear, by my silence, to assent to the thesis put forward by the writer of the annotation that prompted my original letter—namely, that the case for the injection treatment is now proved beyond question.

I am, Sir, yours faithfully,

ARCHIBALD YOUNG.

The University, Glasgow, W., March 11th, 1929.

THE PREVENTION OF INFLUENZA.

To the Editor of THE LANCET.

SIR,—Regarding the value of quarantine regulations in the prevention of influenza (discussed in a leading article in your issue of March 2nd), may I state that during the pandemic of 1918 the late Dr. F. E. Rainsford, then medical superintendent of the Stewart Institutions for Imbeciles and the Hospital for the Insane, Palmerston House, Co. Dublin, called together the staffs of both institutions and suggested they should not go into the City or infected areas during their leave. He also prohibited all visiting, and every care was taken with admittance of food. The result was, his was the only institution in the United Kingdom and Ireland which had no case of influenza, owing to his continuous watchfulness night and day.

I am, Sir, yours faithfully,

E. A. RAINSFORD.

Kingstown, Co. Dublin, March 10th, 1929.

CHRONIC CARBON MONOXIDE POISONING.

To the Editor of THE LANCET.

SIR,—I am trespassing on your space in order to draw the attention of a wider audience to a series of troubles caused by fumes which have recently come under my notice.

In the first category, I have come across lately a number of cases showing headache, fatigue, dizziness, irritability, emotional disturbances, and gastric symptoms, which have been promptly relieved by a change of air, only to relapse when the patient has returned to her original surroundings. In one of these cases, at any rate, it has been found that there was a small leak of gas in the bedroom of the patient, and her symptoms, which had been previously regarded as neurotic, disappeared completely following the repair of this leak. In another case the patient always felt giddy after a bath; the bathroom was very small and the hot water was supplied by a geyser which was fitted with an effective vent-pipe. The room, however, was poorly ventilated and rapidly became full of steam. It was the patient's habit, contrary to instructions, to leave the geyser on during the time he had his bath, and there was ineffective combustion due to clogging of the burners. These symptoms also rapidly cleared up following attention to this point. In another group of cases I have had examples of men who spent a large part of their day in closed saloon cars fitted with an imperfect exhaust. These men have suffered from symptoms thought to be neurotic, but which have cleared up when attention has been drawn to this possible cause. Chronic carbon monoxide poisoning affects the highest centres first, producing fatigue, irritability, and emotional disturbances as the earliest symptoms.

I am mentioning these points because chronic carbon monoxide poisoning is not an uncommon event in my experience. The acute cases are readily recognised, but these chronic cases, in which the subject inspires small quantities of carbon monoxide gas over a long time, may easily escape notice or thought to be of a psychic origin. It has been pointed out by Glaister and Logan that an ordinary 20 h.p. motor-car will produce in five minutes sufficient gas in the exhaust to make the atmosphere of a small garage noxious, and the writer has personal experience of severe headache following whiffs of exhaust gas which are occasionally met with in London traffic blocks. It might be of interest to note that analysis of the air round Vauxhall and in Paris shows that a small percentage of carbon monoxide is occasionally present.

The treatment for the conditions is not by drugs except in a secondary capacity, but consists in replacing the amount of available oxygen which is lost to the body by a combination of hæmoglobin with carbon monoxide. This, of course, can be done either by a change of air immediately or by inhalation of oxygen and 5 per cent. carbon dioxide through a properly fitting inhaler. In the writer's experience, which is detailed at length in a recent paper on fume diseases to the Medico-Legal Society, this condition is commoner than is generally supposed.

I am, Sir, yours faithfully,

GERALD SLOT, M.D.

Harley-street, W., March 8th, 1929.

NOISE AND ANNOYANCE.

To the Editor of THE LANCET.

SIR,—I have read your article in THE LANCET of to-day's date with pleasure, but I would like to give you the true history of the campaign against noise so far as the British Medical Association is concerned. I was the first to bring the matter as a public health problem before the Public Health Committee of Edinburgh Town Council. The committee was quite in agreement with my view that noise should be treated as a nuisance within the meaning of the Public Health Act (the Scottish Act is the latest for 1897). I then brought the subject before the Division and Branch of the B.M.A. here, and they agreed upon the resolutions which were adopted at the Cardiff Annual Meeting. The Town Council of Edinburgh is now promoting a Provisional Order, and there is to be a clause in it dealing with noise. This will come before Parliament at an early date.

You will see from the above facts that I have played a rather important part in getting public opinion, and especially medical opinion, to bear on the question. I gladly acknowledge the part that Prof. Spooner and Dr. Dan McKenzie have played in the initial and present stages of the propaganda.

I am, Sir, yours faithfully,

Edinburgh, March 16th, 1929. T. G. NASMYTH.

ERRATUM.—In an article on the use of avertin for anæsthesia by Dr. J. Blomfield and Dr. F. E. Shipway, which appeared in our last issue, the word *omnopon* was printed in two places as omnoform.

LIVERPOOL FOOT HOSPITAL.—This institution was opened only at the end of October, but it has treated 1369 patients, and a third operating room is already needed. The work is restricted to the alleviation of minor foot troubles; patients who require surgical treatment are recommended for admission to a general hospital.

QUEEN CHARLOTTE'S MATERNITY HOSPITAL.—This hospital has decided to purchase a site of five acres on the Goldhawk-road, near Ravenscourt Park Station, in the borough of Hammersmith. Building will soon begin on the first section of what it is hoped will ultimately be the largest maternity hospital in the Empire. Mr. Edwin Stanley Hall, F.R.I.B.A., has been appointed architect, and the first section of the work to be carried out will be that of a separate isolation block, with research facilities for patients suffering from puerperal fever. Such cases will be received in large numbers, and laboratory research and the training of post-graduate students and midwives will be based upon the study of them.

Public Health Services.

INFLUENZA.

CLINICAL reports indicate that the epidemic has now passed its maximum in most districts of England and Wales. An increase in the number of cases is reported from Birmingham and Shrewsbury, and the incidence is still high round Norwood and Selhurst and on the Hampshire borders of Surrey. There is also considerable prevalence in Nottingham, Lincoln, Grimsby, Doncaster, Sheffield, Leeds, Bradford, and other West Riding towns, as well as in Norwich, Newmarket, Buckinghamshire, and South Wales. A definite decline is reported from Manchester, Liverpool, and other Lancashire towns, Newcastle, and South Shields, as well as in London, Reading, Portsmouth, and Southampton. The disease is mostly mild but a certain amount of pneumonia is reported from some of the larger towns, as well as from Radstock in Somerset. In Grimsby many cases are proving rapidly fatal from acute œdema of the lungs. On the continent the epidemic has apparently reached its maximum in Northern France and the Rhine area, while it is on the wane elsewhere.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED MARCH 9TH, 1929.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 289; scarlet fever, 2215; diphtheria, 1137; enteric fever, 28; pneumonia, 5818 (last week 5874); puerperal fever, 42; puerperal pyrexia, 131; cerebro-spinal fever, 15; acute poliomyelitis, 6; acute polio-encephalitis, 2; encephalitis lethargica, 28; dysentery, 8; ophthalmia neonatorum, 103. No case of cholera, plague, or typhus fever was notified during the week. It will be seen that the notifications of pneumonia have not quite reached the level of the previous week.

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on March 12th–13th was as follows:—Small-pox, 88 under treatment, 9 under observation; scarlet fever, 1708; diphtheria, 1876; enteric fever, 8; measles, 81; whooping-cough, 1119; puerperal fever, 18 (plus 8 babies); encephalitis lethargica, 78; poliomyelitis, 7; "other diseases," 68. At St. Margaret's Hospital there were 11 babies (plus 6 mothers) with ophthalmia neonatorum.

The increase of 54 in the number of small-pox patients under treatment or observation in M.A.B. Hospitals is a corollary of the fact that cases of small-pox are being reported from many of the metropolitan boroughs—namely, in the week under review, from Bethnal Green, 1; Finsbury, 3; Islington, 1; Lambeth, 1; Poplar, 5; St. Pancras, 1; Southwark, 3; and Stepney, 3; while East Ham reported 2 and West Ham 43 cases.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox, 1 (0) from enteric fever, 88 (1) from measles, 10 (3) from scarlet fever, 250 (74) from whooping-cough, 42 (5) from diphtheria, 65 (9) from diarrhœa and enteritis under two years, and 2127 (312) from influenza. The figures in parentheses are those for London itself.

The number of deaths from influenza during the previous eight weeks was 122, 179, 321, 652, 987, 1243, 1764, and 2183 respectively, the figures for London during the same weeks being 34, 39, 77, 198, 331, 393, 473, and 424. It will be seen that the peak has been passed, not only in London, but in the country as a whole. In the week under review deaths were, however, attributable to influenza in Birmingham, 266; Sheffield, 114; Leeds, 94; Stoke-on-Trent, 80; Bristol, 58; Manchester, 55; Bradford, 54; Leicester, 39; Oldham and Hull, each 36; Walsall, 35; Bolton and Middlesbrough, each 31; while 11 other towns reported between 20 and 30 fatal cases. Deaths from whooping-cough are still widely distributed, the highest figures coming from Manchester, 14; Bolton, 13.

The number of stillbirths registered during the week was 288 (corresponding to a rate of 38 per 1000 births), including 52 in London.

Death-rates from Influenza for the Last Six Weeks.

The course of the influenza epidemic in different parts of the country is indicated by a table which was printed in our issue of March 2nd (p. 471) and the figures of which are here brought up to date.

Week ended—	Aggregate.	North.	Midlands*	South*	Wales.	Greater London
Feb. 2nd, 1929..	1·73	2·14	0·48	2·56	0·53	1·89
,, 9th ,, ..	2·56	2·96	0·77	2·64	0·80	3·20
,, 16th ,, ..	3·29	3·54	1·84	2·90	0·94	4·34
,, 23rd ,, ..	4·67	5·19	3·84	3·52	1·20	5·35
Mar. 2nd ,, ..	5·78	6·26	7·57	4·52	1·87	5·04
,, 9th ,, ..	5·64	5·87	9·67	2·96	2·54	3·97

*Excluding Greater London.

The Registrar-General also compiles the annual death-rates last week for the aggregate of great towns and for some of the largest of these, to illustrate the effect of the present epidemic. They are as follows: 107 great towns, 31·4; London, 28·9; Birmingham, 49·1; Liverpool, 20·4; Manchester, 28·7; Sheffield, 41·3; Leeds, 38·9; Bristol, 34·1; and West Ham, 26·5.

Obituary.

WALTER JAGGER, M.B., C.M. EDIN.

Dr. Jagger, who died at his home in Upper Berkeley-street on March 16th after a short illness, was well known to Edinburgh graduates in London, for he was for many years one of the secretaries of the Edinburgh University Club and an amusing speaker at the Club dinners in London. A native of Shrewsbury, he was educated there, going on to Edinburgh where he qualified in 1896. Joining the Royal Army Medical Corps, he served throughout the South African War, being awarded both Queen's and King's medals. On his return he went into general practice, after having first qualified himself by a series of appointments at Great Ormond-street, the Samaritan Hospital for Women, and the Lincoln County Hospital. During the late war he was on the staff of Princess Christian Hospital for Officers and the hospitals of the Royal Flying Corps in Eaton-square and Bryanston-square. He had a large practice in Mayfair, and his skill in midwifery was recognised by a command to assist at the birth of Princess Elizabeth. As a member of the Council of the Harveian Society he kept in touch with the medico-political problems of the day. Dr. Jagger married Muriel, daughter of Evelyn Rich, who survives him.

WILLIAM WRANGHAM, O.B.E., M.D., M.R.C.P. LOND.,

Dr. Wrangham, who died suddenly on March 6th, was one of the best known practitioners in Bradford. He came of a Lincolnshire family, members of which for several generations had been medical practitioners. His father was a doctor in Lincoln and his brother is Dr. J. M. Wrangham, of Ripponden. Born in 1871, he received his medical education at St. Bartholomew's Hospital and qualified in 1896. After spending nearly four years as a hospital resident he took his M.D. Lond. degree in 1900. Early in the century he settled in Bradford and was soon appointed assistant surgeon to the Royal Eye and Ear Hospital and assistant honorary physician to the Royal Infirmary, to which at the time of his death he was senior physician. He was also chief police surgeon and medical adviser to the Municipal Mental Deficiency Committee. When in 1915 the poor-law hospital was equipped as the Bradford War Hospital he was

appointed commanding officer with the rank of Lieut.-Colonel, and four years later was decorated for his services and received a personal letter from the General commanding the Northern Division congratulating him on the excellence of his administration of the hospital. When, in the following year, St. Luke's Hospital, Bradford, was established as the first municipal hospital in this country, Wrangham was appointed senior visiting physician. In 1921 he became a member of the Royal College of Physicians of London and relinquished general practice. From that time until his death he had had a large and steadily increasing consulting practice, and general practitioners found in him not only a very capable diagnostician, sound in prognosis and helpful in suggestions for treatment, but also a man of the highest probity, who was most honoured and respected by those who knew him best. Dr. Wrangham leaves a widow and two daughters.

ARNOLD WILLIAM MONTFORT AUDEN, M.B. EDIN.

Dr. Arnold Auden, who died on March 6th after a few days' illness, was the eldest son of the Rev. William Auden, vicar of Church Broughton, Derbyshire, and was born in 1863. He was educated at Shrewsbury School where he achieved considerable success as an athlete, winning amongst other events the school steeplechase and the quarter mile. In addition to being "gentleman of the runs," he was a sound football player and rowed in the school eight for two years. On going up to Clare College, Cambridge, he continued his rowing career, rowing in the Clare boat for the three years of his residence, and being boat captain in his last year. After taking the classical tripos in 1886, he took up the profession of teaching, but after some experience as a schoolmaster he decided to study medicine. Accordingly, he went up to Edinburgh University where he graduated as M.B., C.M. in 1895. After a short experience of practice at Shildon, County Durham, he settled down at Leigh, where he spent the rest of his professional life. A man of splendid physique, Dr. Auden devoted himself heart and soul to the demands of a wide and exacting practice, ever ready to help with generous charity the needy and impoverished of his neighbours. He took no part in public affairs, finding in his professional practice a sufficiently heavy call upon his energies and interests. He was unmarried.

ENCEPHALITIS LETHARGICA IN MANCHESTER.—The Manchester Corporation Public Health Committee has instructed the medical officer of health to ascertain whether the local authorities of South Lancashire would be willing to coöperate with Manchester in preparing a scheme for the treatment of persons suffering from encephalitis lethargica. The Ministry of Health has issued a circular urging all public health authorities to make special provision for such cases in their respective areas. The Manchester Committee had before them a report showing that while some cases are treated by the guardians in Swinton House and some in the ordinary ward of their institutions, there are other patients suffering from serious after-effects of the disease for whom additional accommodation is required.

DONATIONS AND BEQUESTS.—Dr. Oliviera Castro, of Portugal, has given £1000 to the Queen's Hospital for Children, Hackney-road, London, for the purpose of endowing a cot which will bear the following inscription: In memory of Eduardo A. Oliviera Castro, December, 1893, aged 14 years. This cot has been endowed in perpetuity by his father, Dr. Oliviera Castro, as a remembrance, and as a token of sympathy with suffering children amongst the English people, this most cultured and admirable nation. —Among other bequests, the late Mr. Thomas Arthur Springman, of Hampstead, left £5000 to the Royal Northern of Hospital Holloway-road, N.—Mr. Joseph John Johnstone, Craighead, Newport, Fife, left, among other bequests, £1000 each to the Dundee Royal Infirmary and the Royal Victoria Hospital, Dundee.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

LOCAL GOVERNMENT BILL.

ON Thursday, March 14th, the House of Lords considered the Local Government Bill on Report.

Administrative Schemes.

On clause 4 Lord COZENS-HARDY moved an amendment providing that the administration scheme should deal with the discharge of transferred functions and with any other similar functions now performed under the various Public Health Acts. The amendment was negatived on Lord ONSLOW's representation that the present system should be trusted to carry out the functions satisfactorily. The portion of the amendment which might relate to the functions of hospitals, poor-law infirmaries, and cottage hospitals came up for discussion immediately after, upon an amendment moved by Lord HANWORTH to substitute for Clause 13 (Consultation with Bodies Representing Voluntary Hospitals) the following clause:—

"The Council of every county and county borough shall, after consultation with such body or persons within the county or county borough as represent the voluntary hospitals in the area, including representatives of the medical and surgical staffs of any voluntary hospitals in the area, make such arrangements as they think desirable for carrying into effect the functions transferred to them under this Part of this Act with respect to the provision of hospital accommodation and treatment."

"Accommodation" and "Treatment."

The omission of the original clause was agreed upon, and an interesting discussion ensued when Lord ONSLOW supported the amendment, which it will be seen provided for consultation with the representatives of the voluntary hospitals upon treatment as well as upon accommodation. Lord HANSWORTH pointed out that, if any question arose as to what body in a particular county be representative of the voluntary hospitals, the decision might be left to the Ministry of Health, a provision to that effect being inserted in the Bill.

Lord KNUTSFORD then spoke warmly on the question of treatment, drawing a vivid picture of the difference in the service at present provided at the large voluntary hospitals and at the poor-law institutions, while Lord BLEDISLOE gave further support to the amendment by pleading the cause of the cottage hospitals, pointing out in particular the work in treatment carried on by clinics in connexion with small village hospitals under the Education Act, 1921.

Lord DAWSON pointed out the large responsibility which would be undertaken by the new bodies when they entered the field of curative mdicine, as neither the county councils nor the medical men who advised them would have adequate experience of hospital administration for carrying on the new duties, and he suggested that it was the sense of the Committee that help should be brought to them not by compulsion but by conference with the voluntary hospitals and the staffs attached to them, and also with that part of the profession which had always dealt with curative medicine. "There should be," he said, "brought to the aid of these new hospitals the traditions, experience, and knowledge of the voluntary hospitals that had existed for generations, forming an organic nexus between the doctors and the hospital managers." The term "accommodation" to his mind meant fabric and arrangement of buildings, while the term "treatment" covered the purposes for which the structures were used. There was no suggestion that medical men or representatives of hospital managers were coming in at all times to interfere in the new hospitals, but it was meant that real conferences should take place to determine action not only in respect of the buildings to be put up but in respect of the purpose for which they were to be used. He was informed that the best way of providing this was to insert the words "and treatment," but he was wedded not to those words, but to the principle that those who had acquired experience through generations should be able to bring it to the aid of less experienced bodies and individuals. He drew an eloquent picture of the work of a general hospital in support of his contention, giving an illustration of the perils that might surround the ill-advised use of radium, and asked the House not to be satisfied with the mere question of accommodation and fabric, but to ensure that there should be conferences and consultation with the medical profession over the purposes for which the institutions were to be used. If Lord Onslow's clause met the situation why should not this fact be stated in plain English, while scepticism was caused by the fact that the medical profession had not been consulted in drawing up the poor-law part of the Bill. There had here been

no consultation with the heads of his profession. Surely, he said, it would have been natural to have called these heads together and to have said, "We are thinking of giving powers of general treatment to these new county hospitals; can you help us, can you give us advice, and draw up a scheme? We do not, of course, commit ourselves to accepting it." It was because there has been no proper consultation of that sort on the part of the Minister of Health that he was a little sceptical when he found that the Government's clause gave them nothing but a barren concession as to hospital accommodation and contained no words which said that the medical profession should be consulted as to the purpose for which that accommodation was used.

The New Clause.

The Earl of ONSLOW had on the paper the following proposed new clause:—

"The council of every county and county borough shall, before making provision for hospital accommodation in discharge of the functions transferred to them under this Part of this Act, consult with such committee or other body, if any, as they consider to represent both the governing bodies and the medical and surgical staffs of the voluntary hospitals providing services in or for the benefit of the county or county borough."

This clause he understood to meet Lord Dawson's views in regard to any question as to the body representing the voluntary hospitals in an area. He alluded to the number of local committees existing under the Voluntary Hospitals Commission, while the Hospital Association had also a network of committees which would be at the disposal of the local authority, these committees being admittedly formed of laymen. His lordship did not agree that it would be advisable to refer to the Minister of Health questions that might arise locally, as to whether the British Hospitals Association or the Voluntary Hospitals Commission should be selected, as he thought that matter could be left to local discretion. Referring to Lord Dawson's criticisms he considered that if the word "accommodation" was too narrow the same might be said of the word "treatment"—or they might both be termed too broad, for the inclusion of the word "treatment" would place the local authority under the obligation to consult a committee in respect of the medical treatment of patients.

Lord DAWSON proposed that if the word "treatment" could not be inserted the following words might be accepted—"hospital accommodation and the functions to which the accommodations shall be assigned," a suggestion that Lord Onslow said he was prepared to accept and one which fell in with the views of Lord Atkin.

The LORD CHANCELLOR pointed out the inadvisability of placing county councils under a statutory obligation to take advice from the voluntary hospital body with regard to treatment. Lord DAWSON, he said, described this thing as the last that he desired, and their lordships would be wise not to insist on putting in words which apparently no one desired. He was sure that words could be devised to carry out Lord Dawson's contention, and he thought it possible to accept the Government clause with the understanding that before the third reading the Ministry of Health would make an effort, in discussion with Lord Dawson and those whom he invited to coöperate, to find what words would have the effect of bringing in the functions to which "accommodation" could be assigned, without implying interference with matters of detailed treatment. Lord Hanworth's clause being rejected by 52 to 42 votes, Lord ONSLOW moved the Government's new clause in the text given above.

An amendment by Lord DAWSON to add to the consultative bodies "the medical faculty of any university which serves the area, and the duly qualified medical practitioners in the area," was negatived.

Recovery of Expenses.

In a discussion upon the recovery of expenses Lord COZENS-HARDY moved the following new subsection:—

"Provided that any such council or authority may, by agreement with the governing body of any association or fund established for the purpose of providing benefits to members or other beneficiaries thereof, accept from the association or fund, in respect of the expenses incurred by the council or authority in the maintenance of any member or beneficiary of the association or fund, payment of such sums as may be provided by the agreement, in lieu of recovering the whole or any part of the said expenses from the member or beneficiary, or from any person legally to maintain him."

This was agreed to and the Report stage of the Bill was closed.

LOCAL GOVERNMENT (SCOTLAND) BILL.

On Tuesday, March 19th, in the House of Lords, the Earl of AIRLIE, Lord-in-Waiting, moved the second reading of the Local Government (Scotland) Bill. Earl BEAUCHAMP moved the rejection of the Bill. The motion for rejection was negatived by 66 votes to 22, and the Bill was read a second time.

HOUSE OF COMMONS.

WEDNESDAY, MARCH 13TH.

Sick Leave among Women Clerks.

Mr. KELLY asked the Minister of Pensions what was the average number of days of sick leave per head during each of the last three years in the case of women clerical officers, writing assistants, and members of the established typing grades, respectively, employed in his department; and what was the average number of days of sick leave per head in the case of each of the grades concerned taken on account of gastric or nervous trouble, respectively.—Major TRYON gave the information asked for in the first part of the question in the following table:—

—	Year ended Dec. 31st.		
	1926.	1927.	1928.
Clerical officers	9·3	12·7	12·1
Writing assistants	10·9	13·9	11·2
Typing grades	8·1	8·4	11·8

The figures exclude cases of officers whose sick absence amounted to 91 days and over.

The information asked for in the last part of the question was not readily available and could not be obtained without a detailed investigation.

Mr. KELLY asked the Home Secretary a similar question in regard to women clerical officers on the next day.—Sir WILLIAM JOYNSON-HICKS gave the information asked for in the first part of the question in the following table:—

—	1926.	1927.	1928.
Clerical officers	6·1*	6·7*	5·6
Writing assistants	6·2	6·0	4·4
Typing grades	10·9†	10·0	7·6

* Does not include one woman who had 284 days continuous sick leave in 1926 and 1927.
† Does not include one woman who had 105 days sick leave.

He was unable to give the information asked for in the last part of the question.

Mr. KELLY also asked the Under Secretary of State for India a similar question in regard to the women clerical officers in his department.—Earl WINTERTON replied: The following table gives the desired information:—

Year ended Jan. 31st.	Average number of days per head.								
	Sick leave.			Taken on account of gastric trouble.			Taken on account of nervous trouble.		
	Clerical officers.		E.T.G.	Clerical officers.		E.T.G.	Clerical officers.		E.T.G.
	M.	W.		M.	W.		M.	W.	
1927 ..	11·6	18·4	12·4	0·6	2·2	5·0	2·8	0·2	0·4
1928 ..	8·9	9·6	10·1	0·2	1·1	1·5	0·3	2·7	1·3
1929 ..	10·2	15·1	11·4	1·0	0·2	0·2	2·6	1·8	0·2

M., men; W., women. E.T.G., established typing grades.

Mr. KELLY also asked the Secretary for Mines a similar question with regard to the women clerical officers in his department.—Commodore KING gave the information asked for in the first part of the question in the following table:—

—	Year ended Jan. 31st.		
	1927.	1928.	1929.
Clerical officers—Men	6·43	9·77*	6·03
Clerical officers—Women ..	9·20	8·00	11·00†
Established typing grades ..	8·82	5·31	5·65

* Includes three cases of sick leave amounting to 64, 67, and 89 days respectively.
† Includes one case of sick leave amounting to 49 days.

The information asked for in the last part of the question could not be supplied as no detailed record was kept of the types of illness which accounted for the sick leave.

Chlorodyne as a Drug of Addiction.

Viscountess ASTOR asked the Home Secretary whether he was aware that fresh evidence as to the use of chlorodyne as a drug of addiction had come to light since the departmental committee on morphine and heroin addiction reported in 1926; whether, in view of the consequences of the abuse of this drug by persons being able to obtain unlimited quantities by purchase from several chemists at the same time and in the same town, he would bring the preparation within the scope of the Dangerous Drugs Acts; and, failing this action, whether he proposed at an early date to carry out Recommendation 103 (2), which would secure that no preparation could be sold under the name of chlorodyne which contained more than 0·1 per cent. of morphine.—Sir WILLIAM JOYNSON-HICKS replied: The recommendation of the Rolleston Committee has been under consideration, but legislation would be required in order to give effect to it. No opportunity for this has so far occurred, but the matter has not been lost sight of, and it is noted for consideration in connexion with the general question of the revision of the Pharmacy Acts which has been under investigation by a Departmental Committee. I may add that the evidence before the Home Office does not show that the abuse of chlorodyne has been increasing since the Rolleston Committee reported.

Medical Men and Lunacy Certification.

Dr. VERNON DAVIES asked the Minister of Health if his attention had been drawn to the fact that, owing to a recent High Court case, medical men would not run the risk of certifying insane people, and if he proposed to introduce legislation to deal with this situation, which was inimical to the best interests of the afflicted persons and the public.—Sir KINGSLEY WOOD (Parliamentary Secretary to the Ministry of Health) replied: My right hon. friend's attention has been drawn to this case. He hopes that any legislation which may be introduced to amend the Lunacy Laws will include a provision giving effect to the recommendation of this point of the Royal Commission on Lunacy and Mental Disorder.

Tenure of Office of Public Health Officers.

Dr. VERNON DAVIES asked the Minister of Health if his attention had been drawn to the decision of Mr. Justice McCardie in the King's Bench Division in Brown *v.* Dagenham Urban District Council, which affected the security of tenure of public officials by allowing their dismissal at any time at the pleasure of the body employing them, irrespective of any contract as to notice of termination of appointment; and what action he proposed to take to secure the position of officers appointed under the Public Health Acts in view of the state of the law revealed by this decision.—Sir KINGSLEY WOOD replied: My right hon. friend is aware of this case, and the matter is receiving his consideration.

THURSDAY, MARCH 14TH.

The London Lock Hospital.

Mr. PETHICK-LAWRENCE asked the Minister of Health whether he proposed to publish the report of the committee appointed to inquire into the London Lock Hospital.

Mr. ARTHUR GREENWOOD asked the Minister of Health whether, in view of the appeals being made on behalf of the London Lock Hospital and the public anxiety concerning it, he would, for the guidance of the public, publish the report of the committee of inquiry appointed early last year.—Mr. CHAMBERLAIN replied: I am glad to have this opportunity of explaining to the House that I have brought the recommendations of the Committee of Inquiry to the notice of the Board of the Hospital, and have received an assurance, which I accept, that they have already applied themselves to the task of carrying the greater part of the recommendations into practical effect. This task must involve a comprehensive review of the constitution and management of the hospital. A considerable time will therefore be required to complete it, and I do not think it would be in the public interest to publish details of arrangements at the hospital which are already under revision by the responsible governing body, if and so long as I remain satisfied that the extent of the changes made, and the rate of progress in making them, are reasonable.

Insurance Companies and Health Benefits.

Mr. COMPTON asked the Minister of Health whether there were any regulations under the national health insurance system whereby an insurance company with an approved society branch had authority to deduct the premiums due on the insurance policy from any benefits that might be payable.—Mr. CHAMBERLAIN replied: No, Sir. Any such compulsory deduction from the benefit due to an insured person under the National Health Insurance Act would be contrary to an express provision of the Act.

Health Insurance Benefit.

Mr. DAVID GRENFELL asked the Minister of Health if he would give the figures showing the number of weeks for which health insurance benefit had been paid from 1921 to the last available yearly record.—Mr. CHAMBERLAIN replied: Exact particulars are not available as to the number of weeks for which sickness benefit is paid under the National Health Insurance Act, and the following figures for England and Wales from 1921 to the latest year available, estimated from the amount paid each year for sickness and disablement benefits, can only be regarded as rough approximations.

Year 1921 ..	19 million weeks	Year 1925 ..	25 million weeks
,, 1922 ..	19½ ,, ,,	,, 1926 ..	28¼ ,, ,,
,, 1923 ..	20½ ,, ,,	,, 1927 ..	30½ ,, ,,
,, 1924 ..	23½ ,, ,,		

Protection against Anthrax.

Mr. DAY asked the Minister of Health whether his attention had been drawn to an inquest held at Liverpool on March 6th on William Ronald Williamson, a tannery labourer, who died from anthrax; and, in view of the jury's recommendation in this case, if he would consider amending the present law so that in all places where anthrax was likely to be contracted arrangements would be made in order that all suspected cases could be examined and given serum if necessary at any hour of the day or night.—Sir WILLIAM JOYNSON-HICKS (Home Secretary) replied: I have received a report which shows that the death was not due to any lack of facilities for the appropriate treatment, but to the fact that the case was not suspected to be anthrax. A warning as to the dangers of anthrax and as to the necessity for immediate recourse to medical examination is required by Home Office regulation to be posted up in every works of this kind, and I am assured that supplies of the serum are available in all centres where the industries which are subject to this risk are carried on. The warning notice which I have mentioned also enumerates the places at which the serum can be obtained, so that even in the case of isolated factories a supply can always be made available in a few hours. The important thing is that any worker in the industry who is suffering from a boil or pimple or anything that may possibly be anthrax should obtain medical advice and treatment at once.

TUESDAY, MARCH 19TH.

Medical Examination of Emigrants.

Sir JOHN MARRIOTT asked the Secretary for Dominion Affairs how many of the families or individuals who, since January, 1928, had applied for assisted passages to Canada and Australia had failed to satisfy the medical or other requirements of the Dominions; and how many, having satisfied those requirements, had been refused an assisted passage by the Dominion authorities and the Imperial authorities, respectively.—Capt. MARGESSON (Lord of the Treasury) replied: The Dominion authorities are unable to furnish the information asked for in the first part of the question. As regards the second part, no applicants are refused assisted passages if they satisfy the medical tests, and also fulfil the other requirements of the Dominion Governments—that is to say, are going to approved employment and are likely to succeed in that employment.

BIRMINGHAM CONTRIBUTORY SCHEME.—The first complete year's working of this scheme has produced £157,000. In 1927 the Hospital Saturday Fund, which has been taken over as the industrial branch of the scheme, raised £66,000. The number of contributing firms has increased from 2637 to 4219, and the contributions in the factories and workshops have been standardised at 2*d.* per week in place of the varying amounts formerly paid. There are 330,000 contributory members.

ST. ANDREW'S HOSPITAL, DOLLIS HILL.—The annual report of this hospital, which is held in trust by the trustees of the Roman Catholic diocese of Westminster, and is specially intended to meet the needs of the professional and middle classes who cannot afford nursing-home costs, shows that the accommodation is being heavily taxed. Although there is no out-patients' department, more than 300 accidents and other urgent cases have had to be attended. A new pavilion with two wards and 24 beds and an operating theatre is being erected and the building of a nurses' home has been begun. The extensions will cost £30,000, of which only £7274 is as yet available.

Medical News.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—At an ordinary meeting of the Council on March 14th Sir Berkeley Moynihan, the President, in the chair, the diploma of Fellow was conferred upon Ian Douglas Miller, Sydney Univ. and Guy's, who passed the examination in November last and has now complied with the by-laws. The diploma of Member was also conferred upon W. F. Skaife, Oxford and St. Bartholomew's Hospital.

Licences in Dental Surgery were conferred upon the following 31 candidates, who have passed the requisite examinations and have complied with the by-laws of the College:—

A. N. Bery, Univ. Coll.; T. Dagger, M.R.C.S., Liverpool; F. W. Entwistle, Manchester; S. P. Ellis, Guy's; F. G. Evans, Royal Dental; T. H. Felton, Manchester; L. W. G. Fisher, Guy's; H. L. Hale, Royal Dental; Alice M. I. Halsall, Royal Dental; C. Haskins, Bristol; J. E. M. Hennessey, London; O. B. Heywood, Royal Dental; O. M. H. Jones, Guy's; B. Joseph, Royal Dental; H. I. Leon, London; B. Lubner, London; C. D. Malone, Guy's; B. Margand, Univ. Coll.; K. S. Morris, Guy's; Irene Piperno, Royal Dental; R. V. Shepperd, King's Coll.; M. Smith, Manchester; F. H. B. Spence, Guy's; R. Symmons, Guy's; R. M. Tompkins, King's Coll.; T. E. K. Uren, Guy's; T. L. Vaisey, Guy's; B. R. Vincent, Univ. Coll.; W. N. L. Wade, King's Coll.; J. W. Woolley, Guy's; and J. L. Young, King's Coll.

The undermentioned diplomas were conferred (jointly with the Royal College of Physicians) upon the following candidates:—

Diploma in Tropical Medicine and Hygiene.—K. P. Anklesaria, F. C. K. Austin, T. C. Backhouse, R. Bandyopadhyay, S. Batchelor, P. S. Bell, D. D. Bhargava, W. K. Blackie, J. S. Brown, J. Bryant, J. A. Carman, Irene E. Chandler, A. D. Charters, L. S. Chatterji, N. Chilton, H. L. Chopra, J. C. Chukerbutti, N. E. Cook, M. Das, P. T. J. Doss, A. N. Duggal, D. P. Dutta, J. G. Green, H. E. Hargreaves, E. Haworth, R. S. F. Hennessey, H. Joomye, N. Kamchorn, Y. M. Khan, C. E. M. J. Libert, G. A. Messih, G. W. Milledge W. S. Nealor, S. L. Rikhye, S. F. Russell, E. H. Stahly, R. Stanford, Eileen M. Turner, G. G. Udeshi, Alice E. S. Wharton, J. B. A. Wigmore, A. J. W. Wilkins, Cicely D. Williams, and D. B. Wilson.

All of these candidates pursued a course of study at the London School of Hygiene and Tropical Medicine, except J. B. A. Wigmore.

Diploma in Ophthalmic Medicine and Surgery.—S. Annaswami, Y. P. Bedi, G. R. Bhatia, M. D. Bower, G. A. Bradshaw, C. S. Colvin, H. V. Coverdale, H. N. Dewan, Jean M. Dollar, J. B. Dhaubhoora, E. H. W. Elkington, W. D. Hamilton, M. Husnain, Audrey H. Henson, S. J. A. Laubscher, A. A. El. M. Magraby, Sigrid L. S. Pearson F. E. Preston, Gertrude E. Pugmire, B. W. Rycroft, A. E. M. Soliman, A. D. C. Stoute, Annie V. Taylor, Marjorie P. Taylor, and G. Vaishnavi.

UNIVERSITY OF LONDON.—At a meeting of the Senate on Feb. 20th it was resolved:—

(1) That the Department of Hygiene and Public Health at University College be closed on July 31st, and that the work for the Diploma in Public Health and for post-graduate and research students in hygiene hitherto carried on in that department, in conjunction with that in bacteriology carried on in the University College Hospital Medical School for candidates for the D.P.H., be transferred as from the same date to the London School of Hygiene and Tropical Medicine.

(2) That the teaching of Epidemiology and Vital Statistics for the D.P.H. be transferred to the London School of Hygiene and Tropical Medicine as from August 1st, 1929.

(3) That the teaching of, and direction of research in, Epidemiology and Vital Statistics, except for the D.P.H., at present undertaken by a Reader at University College, be continued in the Department of Applied Statistics and Eugenics at University College.

(4) That the Department of Municipal Engineering at University College be reorganised and as from August 1st be known as "The Department of Municipal Engineering and Hygiene."

It was also resolved that a degree of Ph.D. be instituted in non-clinical subjects for external students in the Faculty of Medicine, and that candidates for this degree be required to hold, in a branch of study akin to that in which they propose to proceed to the Ph.D. degree, the degree of M.B., B.S., or B.D.S., or B.Pharm., or B.Sc.

A course of lectures on mental deficiency, supplemented by a course of clinical instruction, will be held at the central buildings of the University from May 27th to June 1st, the arrangements being made by the Council of the Central Association for Mental Welfare in consultation with the University Extension Board. Besides the usual course it is proposed to hold a course in a second week (June 3rd to 8th), which will be open to those who have taken the ordinary course in this or some previous year, mainly for members of the School Medical Service, for the purpose of studying exceptional conditions closely allied to mental deficiency, with practical work including case conferences and discussions on cases presenting conduct difficulties. Full particulars may be had from Miss Evelyn Fox, c/o The University Extension Department, University of London, S.W. 7.

ROYAL DENTAL HOSPITAL OF LONDON: SCHOOL OF DENTAL SURGERY.—A course of post-graduate lectures will be given at this hospital at 6 P.M. on Wednesdays, April 10th and 24th, and the first three Wednesdays in May.

RADIOLOGICAL DIAGNOSIS OF RESPIRATORY DISEASE.—A practical course on the Radiological Diagnosis of Pulmonary Tuberculosis and Disease of the Respiratory Tract will be held at Strasbourg from June 24th to 30th, under the auspices of the Faculté de Médecine and the Association Alsacienne et Lorraine contre la Tuberculose. The number of participants is limited to 15, and application may be made to Dr. E. Vaucher, 8, quai Finkwiller, Strasbourg.

ROYAL LONDON OPHTHALMIC HOSPITAL.—The Gifford Edmonds Prize in Ophthalmology has been awarded to Mr. V. M. Métivier, of the Ophthalmic Department of Edinburgh Royal Infirmary, for an essay on the Causation and Differential Diagnosis of Proptosis. The prize was founded by Miss Sophie Edmonds in memory of her brother, who fell at Magersfontein. It is valued at £100 and is awarded every second year.

SCHOLARSHIPS AND GRANTS IN AID OF RESEARCH.—The Council of the British Medical Association is prepared to receive applications for an Ernest Hart Memorial Scholarship of £200 per annum, and three Research Scholarships, each of £150 per annum. These are given to candidates qualified to undertake research in any subject relating to the causation, prevention, or treatment of disease. Each is tenable for one year, from Oct. 1st, and scholars may be reappointed for not more than two additional terms. A scholar is not necessarily required to devote the whole of his or her time to the work of research, but may hold a junior appointment at a university, medical school or hospital, provided its duties do not interfere with his work as a scholar. The Council is also prepared to receive applications for grants for the assistance of research into the causation, treatment, or prevention of disease. Preference will be given, other things being equal, to members of the medical profession and to applicants who propose to investigate problems directly related to practical medicine.

Applications for scholarships and grants must be made in prescribed form not later than May 25th. Particulars may be had from the Medical Secretary, at the Association's House, Tavistock-square, London, W.C. 1.

ROYAL SOCIETY OF MEDICINE.—The Society's house and library will be closed from Thursday, March 28th, to Tuesday, April 2nd, both days inclusive.

ROYAL NAVY MEDICAL CLUB.—The annual dinner of this club will be held at the Trocadero Restaurant, Piccadilly-circus, on Thursday, April 25th, at 7.30 for 8 P.M. Members who wish to be present are asked to inform the hon. secretary, at Queen Anne's Chambers, Tothill-street, London, S.W. 1, not later than April 17th.

LION HOSPITAL AID SOCIETY.—At the annual dinner of this society last week it was stated that last year £1500 was distributed to hospitals; when it was established 30 years ago the income of the first 12 months was £80. At the dinner £1600 was raised.

SEAMEN'S HOSPITAL SOCIETY.—At the annual court of governors last week Sir Arthur Clarke, the chairman, stated that the beds in the society's seven establishments now number 627. There was an adverse balance of £2000 on the year's working at the Queen Alexandra Memorial Hospital for Seamen at Marseilles, which became one of the society's hospitals at the beginning of 1928.

ST. MARK'S HOSPITAL.—The Lord Mayor of London, Sir Kynaston Studd, accompanied by the Lady Mayoress and the Sheriffs, visited the City-road on March 15th to attend the annual meeting of St. Mark's Hospital. He said that the number of patients admitted last year was 820, and that nearly 900 operations had been performed. The hospital had been enlarged, and the number of beds increased to 72, with a resulting increase of work in all departments, so that further extensions were already necessary, including additional accommodation for nurses, a second operating theatre, and an extension of the cancer research laboratories. These extensions would entail an expenditure of £30,000. Mr. J. P. Lockhart-Mummery spoke of the hospital's supply of radium. Hitherto this had been very meagre, but now, as the result of the generosity of one individual and the allocation of the King Edward's Hospital Fund, St. Mark's had possession for the time being of 250 mg.—enough to treat five patients every fortnight. It could, of course, utilise further supplies.

The Services.

ROYAL NAVAL RESERVE OF OFFICERS.

Surg. Sub-Lt. G. H. Bradshaw to be Surg. Lt.

ROYAL ARMY MEDICAL CORPS.

Lt.-Col. F. A. H. Clarke, having attained the age for compulsory retirement, is placed on retd. pay.

Maj. and Bt. Lt.-Col. H. H. A. Emerson to be Lt.-Col., vice Lt.-Col. F. A. H. Clarke.

The undermentioned Lts. (on prob.) are confirmed in their rank: L. R. S. MacFarlane, W. F. Lane, C. L. Day, A. T. H. Marsden, G. L. Grieve, L. R. H. Keatinge, and W. D. Hughes.

Lt. S. M. Burrows is seed. for duty with the Sudan Def. Force.

Lt. J. M. Ryan is seed. under the provisions of Art. 205, Royal Warrant for pay and Promotion, 1926.

Temp. Lt. H. S. Littlepage relinquishes his commn.

J. Ryan and E. S. O'Sullivan to be temp. Lts.

J. M. Ryan to be Lt. on prob.

ARMY DENTAL CORPS.

W. A. McClelland, W. B. Martin, and J. A. McKillop to be Lts. (on prob.).

RESERVE OF OFFICERS.

Lt. S. P. Wilson, from Sup. Res. of Off. R.A.M.C., to be Capt.

TERRITORIAL ARMY.

Hon. Maj.-Gen. Sir Cuthbert S. Wallace (late R.A.M.C.) to be Hon. Col. R.A.M.C. units 47th (2nd Lond.) Div.

ROYAL AIR FORCE.

Temp. Lt. G. M. Titterington, Dental Surg. (temp. Flying Off., R.A.F.), relinquishes his commn.

The name of Squadron Leader H. L. Burton has been brought to notice by Air Vice-Marshal Sir Edward L. Ellington, Air Officer Commanding, British Forces in Iraq, for distinguished services rendered in connexion with the operations against the Akhwan in the Southern Desert, Iraq, during the period November-May, 1928.

INDIAN MEDICAL SERVICE.

Capts. Durgadas Sanyal, Shaikh Mohamed Afzal Faruki, Bhaskar Balwantrao Gadgil, Fazal-ud-Din, Phanindra Nath Basu, Haji Mahommad Salamat Ullah, and Ranjit Sen to be Majs.

Lt. V. A. Edge to be Capt. (prov.).

Maj. A. E. Grisewood, retd., has been granted the rank of Lt.-Col.

Col. F. G. Proudfoot, Asst. Dir. of Med. Servs., 18th (S. Midland) Div., T.A., is apptd. Hon. Surg. to The King, in succession to Col. T. Kay, K.H.S., T.A., ret.

Medical Diary.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MONDAY, March 25th.—8 P.M., ODONTOLOGY. Casual Communications: Mr. C. H. Howkins: The Dental Aspects of Radium Treatment. Mr. J. B. Parfitt: A Compound Composite Odontoma. Demonstration: Mr. E. C. Sprawson: Some specimens from the Dental Museum of the London Hospital. (Illustrated by lantern slides.)

TUESDAY.—5 P.M., MEDICINE. Short communications dealing with various aspects of Gastric Chemistry. Dr. Leonard Parsons: The Significance of Achlorhydria in Infancy and Childhood. Dr. S. W. Patterson: The Pathology of Gastric Secretion. Dr. T. W. Turner and Dr. J. F. Venables: The True Frequency of Hyperchlorhydria in Duodenal Ulcer. Dr. T. L. Hardy: The Rôle of Hydrochloric Acid in the Causation of Gastric Pain. Dr. W. M. Roberts: The Effect of Oils on Gastric Secretion. A Discussion will follow.

WEDNESDAY.—5 P.M., COMPARATIVE MEDICINE and NEUROLOGY. Special Discussion on Encephalomyelitis of Man and Animals. Openers: Mr. I. A. Galloway (Comparative Medicine), Dr. J. Godwin Greenfield (Neurology), Dr. W. Russell Brain, Dr. Tom Hare, Mr. Leslie P. Pugh, and others will also speak.

The house and library of the Royal Society of Medicine will be closed from Thursday, March 28th, to Tuesday, April 2nd—both days inclusive.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W.

MONDAY, March 25th.—8.30 P.M., Discussion on the Medical Indications for the Induction of Abortion and Premature Labour, introduced by Mr. Eardley L. Holland, Dr. B. T. Parsons-Smith, and Dr. Bernard Hart.

HUNTERIAN SOCIETY.

MONDAY, March 25th.—8.30 P.M. (at Simpson's Restaurant, 2 and 3, Bird-in-Hand Court, 77 Poultry, Cheapside). Discussion on: Blood Pressure in Health and Disease. To be opened by Dr. Halls Dally, Dr. Edgar Obermer, and Dr. Temple Grey.

ST. JOHN'S HOSPITAL DERMATOLOGICAL SOCIETY.

WEDNESDAY, March 27th.—4.15 P.M. (at St. John's Hospital, 49, Leicester-square, W.C.), Clinical Cases.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.

TUESDAY, March 26th.—5 P.M., Dr. R. A. Young: A Medical Review of the Surgery of the Chest. (Third Lumleian Lecture.)

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, W.

MONDAY, March 25th.—10 A.M., Dr. Dowling: Skin Department. 11 A.M., Mr. Tyrrell Gray: Surgical Wards. 2 P.M., Dr. Trevor Davies: Gynæcological Department.

TUESDAY.—2 P.M., Dr. Shaw: Medical Out-patients. 2 P.M., Mr. Sinclair: Surgical Out-patients. 2 P.M., Mr. Hambleu Thomas: Throat, Nose and Ear Department.

WEDNESDAY.—10 A.M., Dr. Burnford: Medical Wards. 2 P.M., Mr. Tyrrell Gray: Operations. 2.30 P.M., Mr. Donald Armour: Surgical Wards.

THURSDAY.—10 A.M., Dr. Grainger Stewart: Neurological Department. 2 P.M., Mr. MacDonald: Genito-urinary Department. 2 P.M., Mr. Bishop Harman: Eye Department.

Medical and Surgical Out-patients, Operations, Special Departments, daily, 10 A.M. to 5 P.M., Saturdays, 10 A.M. to 1 P.M. Courses in Anæsthetics and Operative Surgery.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY, March 25th.—2.30 to 5 P.M.: Medical, Surgical, and Gynæcological Clinics. Operations.

TUESDAY.—2.30 to 5 P.M.: Medical, Surgical, Throat, Nose and Ear Clinics. Operations.

WEDNESDAY.—2.30 to 5 P.M.: Medical, Skin, and Eye Clinics. Operations.

THURSDAY.—11.30 A.M.: Dental Clinics. 2.30 to 5 P.M.: Medical, Surgical, and Ear, Nose and Ear, Nose and Throat Clinics. Operations.

ROYAL NORTHERN HOSPITAL, Holloway-road, N.

TUESDAY, March 26th.—3.15 P.M., Dr. W. R. Reynell: Demonstration of Neurological Cases.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.

THURSDAY, March 28th.—4 P.M., Dr. Schlesinger: Jaundice.

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.

TUESDAY, March 26th.—5 P.M., Dr. H. MacCormac: Malignant Growths of the Skin.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE COURSE.

TUESDAY, March 26th.—4.15 P.M., Mr. H. H. Rayner: Cancer of the Colon: Signs and Symptoms and Results of Operation in a series of 60 cases.

Appointments.

GILFILLAN, S. I., M.B., C.M. Edin., has been appointed Medical Superintendent, Bailbrook House Mental Hospital, Bath.

SAVAGE, RONALD, M.B., Ch.B. Aberd., F.R.C.S. Edin., Aural Surgeon at the Lewisham Treatment Centre (L.C.C.).

Certifying Surgeons under the Factory and Workshop Acts: CARTER, R. H., L.R.C.P. Lond., M.R.C.S. (Waltham Abbey District); GARDNER, G. R., L.R.C.P. Edin., L.R.C.S. Edin., L.R.F.P.S. Glasg. (Hyham Ferrers, Northampton); MACKAY, H. A., M.B., Ch.B. Aberd. (Bucksburn, Aberdeen).

Vacancies.

For further information refer to the advertisement columns.

Ashton-under-Lyne District Infirmary.—H.S. At rate of £150.

Bangor, Carnarvonshire and Anglesey Infirmary.—H.S. £200.

Basingstoke, Hants, Park Prewett Mental Hospital.—Jun. Asst. M.O. £350.

Beit Memorial Fellowships for Medical Research.—Jun. Fellows, £400.

Belgrave Hospital for Children, 1, Clapham-road, S.W.—H.S. Also Asst. H.P. Each at rate of £100.

Bexhill, Borough of.—M.O.H. £800.

Birmingham, Queen's Hospital.—Dental H.S. At rate of £50.

Bournville Works.—M.O.

Cambridge, Addenbrooke's Hospital.—H.S. At rate of £130.

Cardiff, King Edward VII Welsh National Memorial Hospital.—Area Tub. Phys. £750.

Cardiff Union, City Lodge Institution.—Third Asst. Res. M.O. At rate of £150.

City of London Hospital for Diseases of the Heart and Lung, Victoria Park, E.—H.P. At rate of £100.

Coventry, Coventry and Warwickshire Hospital.—Hon. Physician.

Dreadnought Hospital, Greenwich.—H.P. and H.S. At rate of £100.

Durham County Council.—District Tuber. M.O. £600.

East London Hospital for Children, &c., Shadwell, E.—Res. M.O. £200. Also Res. H.S. and Cas. O. Each at rate of £125.
Elizabeth Garrett Anderson Hospital, Euston-road, N.W.—Asst. Obstetrician.
Erelina Hospital for Children, Southwark, S.E.—H.S. £120.
Exeter, Royal Devon and Exeter Hospital.—H.P. At rate of £130.
Fiji, Gilbert and Ellice Islands Colony.—M.O. £600.
Golden-square Throat, Nose and Ear Hospital, W.—Registrar. Also Clin. Asst.
Hereford, Herefordshire General Hospital.—H.S. £150. Also H.P. At rate of £100.
Hospital for Epilepsy and Paralysis, Maida Vale, W.—Res. M.O. Also H.P. At rate of £150 and £100 respectively.
Hospital of St. John and St. Elizabeth, 60, Grove End-road, N.W.—Res. H.S. At rate of £75.
Hull Royal Infirmary.—Third H.S. At rate of £150. Also Hon. Phys.
Lincoln County Hospital.—Jun. H.S. At rate of £150.
Liverpool Port Sanitary Authority.—Asst. Port M.O. £700.
London Female Lock Hospital, 283, Harrow-road, W.—H.S. At rate of £150.
London Temperance Hospital, Hampstead-road, N.W.—H.P. At rate of £100.
Maidstone, West Kent General Hospital.—H.S. £220.
Metropolitan Ear, Nose and Throat Hospital, Fitzroy-square, W.—H.S. £150.
Mildmay Mission Hospital, Austin-street, Bethnal Green, E.—Sen. Res. M.O. At rate of £140. Also Jun. Res. M.O. and Asst. Cas. O. Each at rate of £100.
Newcastle-upon-Tyne, City Hospital for Infectious Diseases.—Res. Med. Asst. £350.
Norwich, Norfolk and Norwich Hospital.—Two H.S's. Each £120.
Oxford, Radcliffe Infirmary and County Hospital.—Hon. Asst. Surgeon.
Penshurst, Cassel Hospital for Functional Nervous Disorders, Swaylands.—Res. M.O. £350.
Plymouth, Central Hospital, Lockyer-street.—Hon. Surgeon.
Poole Borough and Port of.—Asst. M.O.H. £600.
Prince of Wales's General Hospital, Tottenham, N.—Hon. Anæsthetist. £20. Also Hon. Dermatologist.
Princess Louise Kensington Hospital for Children, N. Kensington. H.P. At rate of £75 to £100.
Royal National Orthopædic Hospital, 234, Great Portland-street, W. Hon. Asst. S.
St. Pancras Hospital, 4, King's-road, N.W.—Jun. Asst. Med. Supt., &c. £350.
Samaritan Free Hospital for Women, Marylebone-road, N.W.—Clin. Assts.
Sheffield, Royal Infirmary.—Surgical Registrar. £200.
Southampton, Administrative County of.—M.O.H. £1250.
Stoke-upon-Trent Union, London-road Institution.—Deputy Res. M.O. £400.
Swansea Hospital.—H.S. £150.
Tunbridge Wells and Counties General Hospital.—H.S. £160.
Victoria Hospital for Children, Tite-street, Chelsea, S.W.—Hon. P. or S. for Diseases of the Skin.
Walsall General Hospital.—Jun. H.S. At rate of £100.
West Bromwich and District General Hospital.—H.S. At rate of £200.
Western Skin Hospital, 44, Hampstead-road, N.W.—Hon. Asst. Dermatologist.
Willesden General Hospital, N.W.—Res. H.S. At rate of £100.
Wolverhampton, Royal Hospital.—Res. M.O. At rate of £150.
York, Maternity Hospital and Sanatorium.—Res. M.O. £350.

Births, Marriages, and Deaths.

BIRTHS.

DANSIE.—On March 13th, at Welwyn, Herts, to Marion and Charles Dansie—a son.

DAY.—On March 10th, at Norwich, the wife of Dr. George H. Day, of a son.

HORSFORD.—On March 13th, at Harley-street, W., the wife of Cyril Horsford, M.D., F.R.C.S., of a son.

SHAW.—On March 15th, the wife of Maurice E. Shaw, M.D., of a daughter.

SHELDON.—On March 17th, at a nursing home, the wife of Wilfrid Sheldon, M.D., 22, Wimpole-street, W.1, of a daughter.

DEATHS.

BROWNE.—On March 11th, 1929, at 49, Belgrave-road, S.W.1, James Browne, M.D., aged 69.

BURFIELD.—On March 17th, at Grenofan, Heathfield, Sussex, Thomas Burfield, M.A., M.B.

JAGGER.—On March 16th, after four days' illness, from pneumonia, at his home, Upper Berkeley-street, Portman-square, Walter Jagger, M.B., C.M. Edin.

ORME.—On March 17th, Marie Orme, M.B.E., L.R.C.P.I. & L.R.C.S.I., of Rockside, Matlock, widow of the late Albert L'Estrange Orme, L.R.C.P.I. & L.R.C.S.I. Funeral at Matlock Parish Church, Thursday, March 21st, at 2 P.M.

SHAW-MACKENZIE.—On March 10th, 1929, Charles Frederick Dillon Shaw-Mackenzie, M.B. Edin., fourth son of the late Charles Forbes Wodson Shaw-Mackenzie, of Newhall, Ross-shire.

WALE.—On March 9th, at St. Matthew's-drive, St. Leonards, Malcolm E. H. Wale, L.R.C.P., M.R.C.S.

YOUNG.—On March 12th, suddenly, James Martin Young, M.D., C.M.Aberd., of Calthorpe-road, Edgbaston, Birmingham.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

MAINTENANCE OF LIFE IN ISOLATED MUSCLE.

THE EFFECTS OF ANOXÆMIA.

IN the course of his Ludwig Mond Lecture on the Maintenance of Life and Irritability in Isolated Animal Tissues, delivered at Manchester University on March 6th, Prof. A. V. HILL, F.R.S., justified the use by physiologists of isolated tissues for the study of the problems of the living animal. In medical and physiological progress, he said, improvement in knowledge comes, as it does in chemistry and physics, by the isolation of variables, by studying phenomena in as simple a form as possible, as far removed as may be from the complexity of normal life. He recognised, however, the danger that those who work under artificially simplified conditions may, in their enthusiasm, extend their results too far to practical problems.

He went on: "The greater danger—I speak with feeling—is that their friends, and the daily press, may do so for them. If you describe how a nerve-fibre maintains the electrical potential difference at its boundary by an active process involving the consumption of oxygen, you may find your name in all the newspapers, and be invited to America to raise people from the dead; if you prove that chemical disintegration sets in, in a stimulated muscle deprived of oxygen, you may be charged with attempting to create a living cell (and indeed a living "soul") in the laboratory. There is a real danger, and we academic people must beware of applying our results too far."

With this cautionary preamble Prof. Hill returned to the most difficult problem of all—the cause of a phenomenon which he discovered in 1927—and what follows is in his own words.

About this phenomenon, I speculated last summer, perhaps rather rashly, in the Proceedings of the Royal Society. I say rashly, partly because my paper provoked—via Prof. F. G. Donnan—somewhat undue interest in the public press, partly because the explanation I originally gave may not be sufficient. The facts, however, seem certain and are these. By improvement in technique, which I need not describe now, the rate of resting heat production of a muscle can be measured, in oxygen or in nitrogen. The muscle lies upon the warm junctions of a thermopile, in a thermostat maintained at a constant temperature within a thousandth of a degree, in nitrogen which has been freed from oxygen by passing it over hot copper in a quartz tube. The rate of the resting heat production at 18° C. is (say) 60 g. cm. per gramme per minute; about 1½ thousandths of a calorie. The muscle has previously been washed for some time in salt solution, so that it does not now become spontaneously inexcitable in the manner described by Dulière and Horton. It is stimulated and gives a series of twitches; the heat due to activity is registered by the galvanometer attached to the thermopile; stimulation ends; the galvanometer returns; we should expect it to return, gradually of course, to its original position, the muscle to revert to its original heat-rate. Nothing of the kind. Let me illustrate what happens by a typical experiment:—

Time: A.M. or P.M.	11·56	11·59	12·1	12·2	12·3½	12·5	12·6
Galvanometer deflection: mm.	22	23½	23½	22½	22½	24	23

The muscle was then stimulated by single shocks to fatigue; the galvanometer deflected, and when the stimulation ended, returned to rest once more.

Time P.M.	12·20	12·23	12·25
Galvanometer deflection: mm.	130	130	130

The resting heat-rate in this case has been increased between five and six times. The phenomenon has never failed to appear, and it occurs always in the same quantitative form. The quotient

$$\frac{\text{increment in heat-rate per minute}}{\text{total heat by stimulation}}$$

is always (in the frog's sartorius at 17° C.) of the order of 0·0075. The high heat-rate induced by stimulation is permanent so long as the muscle remains in nitrogen. It may attain 800 g. cm. per gramme per minute after severe fatigue, over 1 calorie per g. per hour. It may remain at this level so long as the muscle is kept in nitrogen, for 24 or even 48 hours, in which time the total heat liberated may be many times as great as can possibly be accounted for by the breakdown of *all* the available carbohydrate into lactic acid. Since, apart from carbohydrate, there is very little except the actual protein of the muscle which we can imagine to break down with such an evolution of heat, we are forced to conclude that the process of anaerobic activity

(or its products) has somehow induced the degradation of the muscle protoplasm itself to bodies containing less total energy.

Resting Heat-rate Drops with Recovery.

If, when the muscle has been fatigued in nitrogen, and its resting heat-rate is high, we admit oxygen, a recovery process sets in as usual, with a considerable evolution of heat. The lactic acid is removed and the muscle is restored to its previous resting condition. This occupies about an hour. If, now, we replaced the oxygen by a stream of pure nitrogen, within half an hour or so diffusion on the one hand, and the resting metabolism of the muscle on the other, have removed the last traces of oxygen from the interior of the muscle substance, and the resting heat-rate in nitrogen can again be measured. Instead of the high value found after stimulation we now observe a low value of the same order of size as before it. The breakdown processes produced by anaerobic activity have been cut short and the muscle has regained its previous steady state. The same treatment can then be applied once more. If the muscle be stimulated to fatigue, its resting heat-rate rises again; if oxygen be again admitted recovery ensues and finally a low value of the resting heat-rate appears as before. There seem to be two alternatives: either (1) the provision of energy by oxidation has restored to their normal state the membranes, interfaces, or agents, which in ordinary life hold apart the unstable reacting substances present in the living cell, which prevent—as I said in my paper—the organised system of the living cell from becoming a biochemical chaos; or (2) in the presence of oxygen some substances have been removed, perhaps by simple oxidation, perhaps by restoration to a precursor, as lactic acid is restored, which, if they be allowed to remain, assist as catalysts, or in some other capacity, in the anaerobic disintegration of the living materia'. One thing seems certain—the high heat-rate *is* a sign of some kind of irreversible breakdown or disintegration; if it be allowed to continue for a few hours no subsequent restoration of the muscle to its normal excitability is possible, either in oxygen or in oxygenated salt solution.

The phenomena in question are so curious, and the effects so relatively large and so easily demonstrated with the methods now available, that they demand an explanation. I have tested them by every means I could think of and they have withstood the attack. Were they due to a change in the hydrogen-ion concentration caused by the liberation of lactic acid? A resting muscle was immersed in pure CO_2 and its heat-rate remained practically unaltered; the Co_2 must have made it as acid as extreme fatigue. Were they due to a technical error of some kind? a reaction of some fatigue product with the metals of the thermopile? The thermopile was insulated with baked Elo (an artificial resin), shellac, and paraffin-wax; on top of these a piece of tin-foil; and over this a further layer of wax. The phenomenon appeared quantitatively as before. It is inconceivable that breakdown products of muscular activity can penetrate wax, tin-foil, wax, shellac, and Elo, one on top of the other. Was it due to injury in dissection? It was found unaltered in a frog's gastrocnemius, which can be prepared with an absolute minimum of injury. The temperature was lowered to 0° C. The high heat-rate existing in a fatigued muscle diminished to one-sixth, which is what we should expect if it were due to a chemical process occurring continuously, not at all what we should look for were a technical physical error the basis of the phenomenon. Many of my colleagues have witnessed the experiment, and they are agreed that in this respect, at any rate, I am not suffering from delusions. The phenomenon exists; it must be explained, not explained away.

Alternative Explanations.

I was inclined when I first described the phenomenon to the first of the two alternatives I mentioned, to the belief that oxygen restores the normal interfaces, or conditions which prevent the organised system from becoming a biochemical chaos. During the last few months, however, I have come across another effect which inclines me a little to the second alternative—perhaps both are correct. The experiment is a simple one and the result quite certain; it ought to have been made long ago; but one only thinks of these things slowly. If a muscle showing a very high resting heat-rate induced by anærobic stimulation be immersed for an hour or two in *oxygen-free* salt solution, its heat-rate returns to its original low level; the muscle need not even be alive; it may have been "electrocuted" by excessive stimulation, it may have been irreversibly damaged by too long a maintenance of its high heat-rate in nitrogen. Yet, under the influence of the washing, in a time which suggests diffusion outwards of some catalysing agent rather than an immediate effect of contact with a new environment, the breakdown evidenced by the previous high heat-rate is completely—or almost completely—stopped. Clearly, oxygen, as such, is not necessary for a reversal of the effect. Perhaps if lactic acid be not already present in excessive amount the lactic acid breakdown can take the place of oxidation in the maintenance of the normal internal architecture of the cell; perhaps, however, *something* is set free in the absence of oxygen, which induces—or helps to induce—the irreversible breakdown of the muscle protoplasm with a liberation of energy: a something which can be dialysed away by immersion of the muscle in salt water.

It is well known that in man too prolonged exposure to anoxæmia may produce harmful effects lasting for a long time or even permanently. As Haldane writes: "A short exposure, even with loss of consciousness, produces no serious after-symptoms; but occasionally a man's behaviour is very abnormal for a few minutes after recovery. . . . With severe and prolonged exposure to want of oxygen the nervous after-symptoms are of an extremely formidable nature and often end in death. . . . The symptoms are evidently due in the main to widespread injury to the nerve cells during the exposure. . . . The heart may also suffer in prolonged exposure to want of oxygen. The after-symptoms may be mainly cardiac; it may be a considerable time before the heart fully recovers. . . . Probably every other organ and tissue in the body feels the after-effects of severe exposure to want of oxygen. The patient often enough dies of pneumonia. Acute nephritis and gangrene of extremities have been noted." And so on. May we not be witnessing here in man the after-effects of the same partial disintegration of the living protoplasm as can so easily be demonstrated in anoxæmia in the isolated muscle?

Further Evidence of Harm from Oxygen Lack.

In another direction, this time in the strips of embryonic tissue studied by Warburg, we find evidence of a harmful effect of oxygen lack. An embryo of a chick is kept for some hours in salt solution saturated with nitrogen; oxygen is then introduced. In the normal embryo there is practically no lactic acid formation if sufficient oxygen be present; the free energy required for continued existence is maintained by oxidation. In the embryo, however, which has been subjected to a period of anoxæmia, the capacity for oxidation is diminished and a large part of the energy it requires must now be derived from the lactic acid breakdown. By anoxæmia, in fact, the normal embryo has been reduced to a state in which its metabolism is similar to that which Warburg has found to characterise tumour tissue. Can it be, as Warburg's work suggests, that oxygen lack working upon the normal architecture and machinery of the cell leaves behind a type of mechanism which leads in the end to the formation of tumour tissue? Dare we see in the disintegrative process produced by anaerobic activity in the isolated muscle cell an exaggerated case of the harmful effect produced in man by prolonged and severe anoxæmia, in the chicken embryo by oxygen want? It is dangerous to speculate too far, but it is foolish not to speculate at all.

I had hoped to be able to tell you the results of further experiments. If the increment in the resting heat-rate produced by anaerobic stimulation be really due to the presence of some diffusible chemical substance liberated in activity, then an extract of, or the dialysate from, a fatigued muscle might produce the same increment without stimulation. Experiments of this kind are being performed, but they have led, as yet, to no decisive result. It may, however, be possible by such means to explore the subject further. We may be able to decide whether in guarding the cell against disintegrative change the lactic-acid breakdown can, as in other respects, take the place of oxidation. To-day I can but indicate the complexity of the problem, the importance of the mechanisms here seen dimly at work, and the depths of our present ignorance of them.

NATIONAL BABY WEEK COUNCIL.

THE annual general meeting was held at Carnegie House on March 13th under the presidency of Sir Gomer Berry, chairman of the Council. He said that the chief aim of the Council's existence was the creation and establishment of a sound public opinion about maternity and child welfare, and this was achieved not only by general propaganda but also through intensive work by the members, who best knew the needs of their own areas. The Council had carried on its activities for 12 years, and was now linked up with some 70 national societies, but its regular income was totally inadequate for its needs. Sir Gomer then presented the challenge shields and other awards for local baby week campaigns in 1928, the Lady Astor shield for the great towns being won by Kettering, and the William Hardy shield for smaller areas by Hill and Cakemore.

Dr. Eric Pritchard, in presenting the annual report, said that the three points on which special attention had been concentrated in the 1928 campaign were: (1) immunisation

as a means of protecting young children against disease; (2) prevention of maternal mortality; (3) new developments in maternity and child welfare work. He spoke with appreciation of the help given by volunteers, by the press, and by certain commercial firms.—Dr. A. Stuart Hebblethwaite (M.O.H. for Sunderland) said he considered ignorance a prime factor in the suffering and ill-health among babies. Last year Sunderland's infant mortality-rate fell below 90 for the first time, but unfortunately the figure had been doubled in the first two months of this year, owing to measles, influenza, colds, and the great poverty prevailing.

Mr. Percy Gates, M.P., gave an address on the Development of the Child Welfare Movement and Block Grants. Since 1918, he said, the public health services had been working under a percentage system of grants, those grants being based on the expenditure of the local authority concerned. Under the Local Government Bill the Exchequer grants were to be paid to counties and county boroughs according to the needs of the locality estimated on a formula, and not according to expenditure. Though Mr. Gates had been responsible for introducing an amendment in the committee stage in the House of Commons to exclude maternity and child welfare services from the block grant provision—which amendment had not been adopted—he paid a tribute to the great consideration shown by the Minister of Health in his willingness to adopt certain safeguards, and admitted that he had made out a strong case for the alteration of the system. It was now for those interested in child welfare to use their influence in their own localities by serving on public bodies as well as on voluntary committees, to make the service as efficient as possible.

THE POSITION OF SUSSEX HOSPITALS.

THE last day of February brought to a close the annual meetings of the hospitals in Sussex whose year ends on Dec. 31st. Almost all of them say that their premises must be extended if they are to cope with the growing demand. At the same time they have to record a certain amount of indifference among the general public as gauged by the subscriptions.

On Feb. 28th Brigadier-General d'A. G. Brownlow said that as long as the *Royal Sussex County Hospital* had to go on gambling on free legacies the financial position could not be regarded as satisfactory. The governors were faced with a mountain of apathy. The report showed that the decrease in the number of patients admitted to the in-patient department and the increase in the average number of beds occupied and length of stay in hospital which was so noticeable in 1927 had continued in 1928. Some two-thirds of the in-patients underwent operations in the theatres, and the strain on the surgical and nursing staffs had been enormous. The theatres were no longer adequate for the work, and the 2181 operations had been performed in precisely the same space as was deemed sufficient for the performance of some 800 when the present suite was built 25 years ago. Mr. Bernhard Baron was going to give £5000 towards the provision of a new operating theatre, and the work would be put in hand as speedily as possible. There had also been a great increase, said General Brownlow, in the work of the pathological and bacteriological department, and the governors had reluctantly determined to close the school of massage, as it would be necessary to secure a considerable increase of accommodation to meet modern requirements and to secure an economical number of students, and this could not be found. The ordinary income had failed to meet ordinary expenditure by £5302, but owing to legacies a credit balance of £5580 was shown on the income and expenditure account. The result of the centenary appeal fund for £100,000 had been very disappointing, producing only £45,000, of which £10,000 was given by Mr. Bernhard Baron. The rise of rates was stated to have largely accounted for the average cost of each in-patient per week going up by 3*s*. 7*d*.

The *Royal Alexandra Hospital for Sick Children* in Dyke-road, Brighton, has now 100 beds, as compared with 74 in previous years. Its income in 1928 was insufficient to meet the expenditure by £744, and the annual report stated that at least another £1000 a year was required to meet the ordinary annual expenditure.—The *Sussex Eye Hospital* has appealed for £25,000 to bring the institution up to date. It is hoped to increase the number of beds from 30 to 50.—The *Sussex Maternity and Women's Hospital* is to be enlarged by the erection of a second new labour ward. The fact that no fewer than 143 patients attended the private wards last year is held to show that they fulfil a useful purpose. The institution's rates have not yet been paid for 1928, but the governors recorded their appreciation of the sympathy of the Finance Committee of the Brighton Corporation with regard to the assessment.

At the annual meeting of the *Brighton and Hove Dispensary* the chairman of the committee said hospitals were constantly being told to keep abreast of the times, and surely the best way to bring that about would be to relieve hospitals of the heavy burden of rates. Nearly 6500 out-patients were treated during 1928 and over 1600 visits were made to the homes of patients. At Hove Hospital the in-patients numbered 392 and the casualties 1635.—At the annual meeting of the *Sussex Throat and Ear Hospital* regret was expressed that the extension decided upon some years ago could still not be proceeded with. It was stated that the building fund, although it now amounted to £2650, did not justify beginning the work. The practice of the hospital is steadily increasing, but ordinary expenditure considerably exceeds ordinary income.—The *New Sussex Hospital for Women and Children* at Brighton, which is entirely staffed by women, has opened a new wing free from debt. The hospital is carrying out investigations in conjunction with three other hospitals on the treatment of cancer with radium. It is to be incorporated as a limited association, not for profit, and it is hoped to make the hospital a training school for nurses in the near future.

The *Queen Victoria Cottage Hospital at East Grinstead* records an improvement in the financial position as the result of an urgent appeal. The need of extension is said to be very pressing, but a scheme involving an expenditure of £8500 has had to be turned down, as the money is not forthcoming.—Extensions at *Worthing Hospital* since 1924 have cost nearly £41,000. The year's working shows a deficit of £656, and the fact that only £1150 came in by annual subscriptions is considered unsatisfactory in a town of the size and importance of Worthing.

ALLERGIC PHENOMENA IN RHEUMATISM.

IN an annotation last week entitled New Views on Rheumatism in Childhood attention was called to the possibility of rheumatism being in the nature of an allergic reaction. Dr. G. Arbour Stephens writes to recall an article in the *Medical Journal and Record* for Feb. 17th, 1926, wherein he described an anaphylactic condition, determined by the bites of insects, in relation to rheumatic fever.

THE WORK OF No. 3 CANADIAN GENERAL HOSPITAL.

THIS is just the book[1] that any one who served, or lost a relative who served, in No. 3 Canadian General Hospital would be glad to possess. It follows all the moves, retells all the events that in retrospect have come to mean so much, and reproduces many photographs of people and scenes that will bring a thrill. The book gives a good account of the history of the unit from its conception by its first commanding officer, Col. H. S. Birkett, in October, 1914, through its arrival in France on June 18th (Waterloo Day), 1915, to its return to Montreal on July 4th, 1919, after what Sir Arthur Sloggett, the Director-General in France, described as splendid service, during which it had dealt with 143,762 admissions. The first chief of the Medical Section was Lieut.-Colonel John McCrae, whose beautiful lines established the cult of the Flanders poppy, and who died of pneumonia just after his promotion to be Consulting Physician in the British Army. The hospital did most of its work at Boulogne, where it suffered much in air-raids, but pulled its weight in the heavy work of the force and materially helped in advancing the knowledge of medicine and surgery and the care of the wounded. We would have gladly seen more of the diary of Private McMutchkin (p. 21) who was wounded in the Salient, but as the doctor said it was in the Rolandic area, supposed he must have been moved there when unconscious! Several abstracts of valuable scientific papers are preserved in the book; the coolness of the nurses under fire and their self-denying care of their patients during air-raids is recorded, also the Christmas and other festivities, and our only regret is the want of an index of people and matters. Everyone distinguished seems to have wanted to see this hospital and to have been pleased with what he saw.

ROYAL WESTMINSTER OPHTHALMIC HOSPITAL.

A PARAGRAPH on p. 568 of our last issue briefly reported the proceedings at the first annual meeting of the Royal Westminster Ophthalmic Hospital to be held at the new premises in Broad-street, W.C. By inadvertence the name of the hospital was confused with that of the Western Ophthalmic Hospital, whose in-patient department is now temporarily housed in the Hospital for Epilepsy and Paralysis, Maida Vale, whilst out-patients attend at 264, Edgware-road, W.

[1] No. 3 Canadian General Hospital (McGill), 1914–19. Edited and compiled by R. C. Featherstonhaugh. With a foreword from Field-Marshal H.R.H. The Duke of Connaught. The Gazette Printing Company, Montreal. 1928. Pp. 274. $5.